

# Pediatric Skills and Scenario-Based Assessment for the First Responder



# Introduction

**Pediatric emergencies present the pre-hospital responder with situations full of emotional impact, but at the same time can provide the responder with some comfort in the following areas:**

- ❖ Pediatric patients generally present with a single problem uncomplicated by other underlying disease processes.
- ❖ Pediatric patients generally compensate for impaired life functions more efficiently than the adult patient does.
- ❖ Pediatric patients generally respond better to basic life support procedures than an adult patient.

This guidebook is designed to assist you in reducing your anxiety in dealing with pediatric emergencies by enriching the cognitive and psychomotor abilities through practice skill sessions and knowledge point sections. The goal of this guidebook is to reduce the stress that responders feel when confronted with a pediatric emergency by providing the opportunity to reinforce knowledge and refine skills through in-service training. The recurrent theme is that while children are different in many ways from their adult counterparts, the management of their emergencies is often easier and yield better outcomes.

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## **AIRWAY SKILL STATION**

**Objectives:**

1. To teach the following methods of airway control, as they apply to the pediatric patient: positioning, suctioning, oral airways, nasal airways, oxygen delivery devices, airway maneuvers, auscultating breath sounds and infection control when treating the patient's airway and ventilation problems.
2. To teach the technique of bag-valve-mask ventilation.

**Time:**

30 minutes

**Students:**

12 students/station

**Instructors:**

1 or 2 instructors

**Facility:**

A room with 3 high tables arranged in a "U" configuration--instructors inside, students outside.

**Equipment:**

- \*3 resusci-babies
- \*3 pediatric airway heads
- \*3 sets each of oral/nasal airways
- \*1 oxygen tank
- \*3 pediatric Yankauer suction catheters
- \*3 bag-mask-valve (BVM) units with assorted sized masks (including infant size)
- \*3 stethoscopes
- gloves, masks and eye protection (enough for each student)

**Organization:**

Keeping in mind that there should be minimum presentation and maximum practice time, the instructor should provide a brief demonstration emphasizing technique. The students should be required to demonstrate successful positive pressure ventilation with (no more than 30 seconds without providing appropriate oxygenation), appropriate insertion of a oral or nasal airway (measurement and insertion), proper assessment of breath sounds and use of a stethoscope and appropriate bag-valve-mask technique (rate, I/E ratio, chest rise, hand position and mask seal). **It is also important to stress that students start at the beginning with establishing unresponsiveness, opening of the airway, "look, listen and feel" for breathing, and giving two initial breaths before moving on to airway adjuncts and BVM. The instructor should reinforce teaching points during the practice session by questioning students and presenting case scenarios.** One particularly important teaching method is to suddenly move an airway head immediately after a student has successfully placed the BVM, illustrating how easily a pediatric airway can be effected.

### **Demonstrations:**

- A. Manual Airway Maneuvers
  - 1. Air-sniffing position.
  - 2. Opening and assessing the airway
  - 3. Jaw Thrust/Chin Lift
  - 4. Oral Airways
  - 5. Nasal Airways
  - 6. Suction
- B. Auscultating Breath Sounds
- C. Bag-Valve-Mask Ventilation Technique

### **Return Demonstrations:**

Students are expected to complete a return demonstration of:

- 1. Manual Airway Maneuvers
- 2. Auscultating Breath Sounds
- 3. Bag-Valve-Mask Ventilation

### **Knowledge Points:**

1. The majority of pediatric emergencies are respiratory related. Unlike the adult, whose primary emergency event is cardiac in nature, respiratory problems are the leading cause of cardiopulmonary arrest in children (65%). In the non-traumatic pediatric emergency, four of the most common causes of admission to the hospital are respiratory in nature (asthma, pneumonia, croup/epiglottitis and near-miss sudden infant death syndrome).
2. General appearance will sometimes be the best diagnostic tool utilized. Determining the severity of the patient's distress will dictate the treatment course chosen. Observe the patient for obvious signs of distress. Is the patient's work of breathing increased? Are there signs of nasal flaring or retraction when the patients takes a breath? What position is the patient found in? What color is their skin? Are there signs of cyanosis? Are there any audible breath sounds (sounds you can hear without using a stethoscope)? Does the patient appear sleepy, tired or exhausted (signs of impending respiratory arrest)? Is the patient's respiratory rate faster than is normal for their age group? Is the patient experiencing a change in behavior (irritability, agitation are signs of hypoxia)?
3. The normal respiratory rates for children are:
  - A. Newborn - 40 bpm
  - B. Infants (<1 yo) - 30 bpm
  - C. Toddlers ( 1 - 3 yo) - 25 bpm
  - D. Child ( 3 - 8 yo) - 22 bpm
  - E. Older Child ( 8 – 17 yo) - 20 bpm
4. Children tend to be in a relative anemia. They have less hemoglobin circulating in their bloodstream than adults do. Because of this condition, children can become hypoxic faster than adults can. Their oxygen levels can be dangerously low even without the presence of cyanosis. If the child is blue they are seriously hypoxic.
5. Never hesitate to give oxygen to a child you suspect is in trouble. It should be the first priority in treating the pediatric patient in respiratory distress, shock, or other severe condition. However, never force oxygen or oxygen delivery devices on a child. Forcing this treatment could upset the child, and cause them to cry, further increasing their respiratory distress. If the patient will not cooperate, don't force it on the patient. Utilize the parents in giving oxygen to the patient. Give them the mask or oxygen tubing and instruct them to aim it in the general area of the patients face. A little oxygen is better than none at all. A neat trick is to take a paper cup and poke a hole in the bottom of the cup, insert the end of the oxygen tube through the bottom and hand it to the parent or patient. It is a less scary way to deliver oxygen to the patient.
6. What ever position the conscious child assumes while in respiratory distress, that is the

position you should leave them in. Forcing them to lie down could make them worse. Patients, in respiratory distress, will assume the position that enhances breathing. The most common position is the "tripod" position. In this position, the patient will lean forward, and prop up on their arms.

7. The optimum position, for the unresponsive patient, when delivering positive pressure ventilation, is the "sniffing" position. Because of the large size of the occipital bone of the skull, it causes the head to flex forward when the small child lies flat. This tends to obstruct the airway. Proper positioning of the head, when opening the airway of the smaller child is very important. Positioning the child's head, so that the nose is pointing straight up, like they are sniffing a flower, creates the optimal airway for the pediatric patient. Another method for positioning the airway is to place a small, folded towel under the patient's shoulders. This helps to raise the shoulders level with the occipital area of the head. This will help to place the patient's airway in the "sniffing" position.
8. Care should be taken, not to over extend the smaller child's airway. The small, narrow, pliable airway of the smaller child will collapse on itself, creating a complete airway obstruction. When positioning for positive pressure ventilation, assure that the airway is opened in the "sniffing" position.
9. In most cases 6 - 10 liters of oxygen, by a partial re-breathing mask (infants) or non re-breather mask (toddlers and older children), is sufficient for supplying oxygen in most cases. If there is evidence of apnea, gasping, or persistent cyanosis, despite a brief (less than 30 seconds) trial of high concentration oxygenation, positive pressure ventilation should be administered. Due to the large size of most children's tongues, an oral airway should be utilized, if a BVM is used.
10. Bag-valve-mask devices should be "self-inflating" bags. For newborns and infants, a ½ liter bag should be used. For larger children, a 1-liter bag should be used. A variety of different sized masks should be available for a proper mask fit. All pediatric BVM's should have a "pop off " valve. This will prevent the delivery of excessive ventilation pressures when bagging the patient. This will also prevent excessive force from popping the patients lungs (like a balloon) this could be very hazardous for the patient. The one exception, is the child with an airway obstruction. In this case, the "pop off" valve should be deactivated. This will allow extra pressure to be applied, in an attempt to bypass the obstruction.

# **MEGACODE SKILL STATION**

## **Objectives:**

1. To review pediatric Basic Life Support.
2. To teach that ventilation is the first line approach to resuscitation/ treatment of the pediatric patient during medical emergencies.
3. To discuss the assessment and initial management of medical emergencies in the pediatric patient.

## **Time:**

60 minutes

## **Students:**

6 students/station

## **Instructor:**

1 instructor

## **Facility:**

A small room with a stretcher

## **Equipment:**

- \*1 resusci-baby
- \*1 life-size doll the size of a toddler
- \*1 pediatric jump kit with basic equipment including BVM with mask (assorted sizes), oxygen mask, nasal cannula, oral/nasal airways, stethoscope, tape, dressings and bandage, ace wrap, Yankauer suction catheter, gloves, penlight, pediatric blood pressure cuff
- \*1 long backboard
- \*1 oxygen tank
- \*1 sheet or blanket

## **Organization**

This station is designed to provide students with direct “hands on” practice, using pediatric equipment and manikins, in managing a resuscitation.

In this approach, the instructor chooses two students prior to the presentation of each scenario. The students then manage the scenario, in an interactive fashion with the instructor. At the end of each scenario, the four remaining students critique the management they observed. Before going on to the next scenario, the instructor should reinforce the main points of the scenario by posing a few "knowledge points" for further discussion. This is the preferred structure for initial training and certification.

**Megacode Scenario - 1**  
(Cardiopulmonary Arrest)

You are dispatched on a call to a home where a mother reported that her baby was "turning blue". (History - Bronchiolitis for two days.)

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number of Patients, Additional Resources, Scene Safety	1. Baby in mothers arms, limp, unresponsive, looks blue, mother hands you the child, scene is safe, ALS unit 10 minutes away
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, respiratory effort, audible breath sounds, and LOC	2. No spontaneous movement, unresponsive, airway obstructed by tongue, no audible breath sounds, gasping for air
3. Position - flat surface, open airway, air sniffing position, jaw thrust/chin lift, look, listen and feel, reassess respiratory effort, assess breath sounds, skin color	3. Airway open, RR=6, poor chest rise, breath sounds equal & clear, cyanotic
4. Begin PPV with bag/mask with oral airway and 100% oxygen, rate 30 – 40, assess breath sounds, chest rise ( <b>Give first two breaths rapidly without oxygen</b> )	4. Patient has no gag reflex, breath sounds equal & clear, good symmetrical chest rise, skin cyanotic
5. Assess circulation: brachial/radial pulses, skin color/temp, CRT	5. Weak brachial pulse, HR=40 bpm, CRT=5 seconds, cyanotic, cool, diaphoretic

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| 6.  | Begin compressions with proper technique and rate = 100 (5:1), depth 1/2" to 1"   | 6.  | Adequate compressions, brachial pulse felt during compressions, rate 100   |
| 7.  | Reassess ABC's after 1 minute   | 7.  | Airway open, RR=6, gasping, brachial pulse=40 bpm  |
| 8.  | Continue CPR with BVM and 100% O <sub>2</sub>   | 8.  | Brachial pulses felt with compressions, color improving, good chest rise with ventilations   |
| 9.  | Note mental/neuro status (AVPU), assess pupils, muscle tone, fontanel   | 9.  | Unresponsive to painful stimuli, flaccid, pupils dilated, slow to respond, soft fontanel   |
| 10. | Load and go   | 10. | <b>Cardiopulmonary Arrest</b>  |
| 11. | Reassess ABC's and mental/neuro status (always reassess after moving patient)   | 11. | No improvement in patient's condition  |
| 12. | After 5 minutes, reassess patient's ABC's and mental/neuro status   | 12. | Improvement in patient's condition, brachial pulse weak, HR=70 bpm, CRT=4 seconds, RR=6, gasping, unresponsive to pain, skin pale, cool, clammy <b>(Stop Compressions)</b> |
| 13. | Continue PPV with BVM and 100% oxygen   | 13. | Good chest rise, breath sounds equal & clear, skin pinkening up  |
| 14. | Reassess airway, respiratory effort, circulation, skin color/temp, CRT, LOC   | 14. | Airway open, RR=8, brachial pulse stronger, HR=110 bpm, skin pinkening up, cool, CRT=3, unresponsive   |
| 15. | Detailed assessment: head to toe examination - head, neck, chest, abdomen, pelvis, lower extremities, upper extremities | 15. | No obvious conditions/problems observed (rash, injuries, etc.)   |

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| 16. | Keep patient warm  | 16. | Cover patient with blanket.  |
| 17. | Chemstrip  | 17. | Chemstrip = 90   |
| 18. | Continue to assist ventilations with BVM and 100% O <sub>2</sub> | 18. | Good chest rise, breath sounds equal & clear, skin pinkening up  |
| 19. | Reassess PRN   | 19. | LOC=unresponsive<br>Pupils=equal & responsive<br>Airway=open & clear<br>Breathing=8, shallow<br>Pulse=120 bpm, brachial, strong<br>Skin=pink, warm, dry<br>CRT=2 seconds |

### **Knowledge Points:**

- 1. The large majority of pediatric cardiopulmonary arrests are unwitnessed respiratory arrests.**
- 2. Respiratory distress and arrest are the leading causes of cardiopulmonary arrest in children.**
- 3. If respiratory distress is allowed to progress to respiratory arrest, hypoxia and acidosis often prevent the heart from responding to the interventions that may start it beating again. It is vital that respiratory distress be recognized early, and prevented from progressing. The recovery potential for the pediatric heart, decreases with every minute inadequate oxygenation continues.**
- 4. High concentrations of oxygen and/or positive pressure ventilation must be administered to any child that is hypoventilating. This will prevent the patient from progressing to respiratory and/or cardiac arrest.**
- 5. Chest rise is the most adequate measuring tool for proper ventilation.**
- 6. Positive pressure ventilations are delivered with a slow inspiratory time and low pressures. Ventilation should be performed just until adequate chest rise is evident. This will prevent over inflation of the lungs, and potential injury to the lungs.**
- 7. If the heart rate drops below 60 bpm, in the infant, and below 40 bpm, in the older child, compressions should be started.**
- 8. After every fifth compression, there should be a pause to allow for adequate chest rise with each ventilation.**

## **Megacode Scenario - 2**

(Cardiopulmonary Arrest/Drowning)

You are called to a home where a three year old was found floating in a pool. Ineffective bystander CPR is in progress.

### **Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number of Patients, Additional Resources, Scene Safety	1. Patient supine on pool deck, bystanders doing CPR poorly, 1 patient, ALS unit 20 minutes away, scene is safe
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, respiratory efforts, audible breath sounds, and LOC	2. No spontaneous movement, unresponsive to pain, airway open, no audible breath sounds, RR=0, no chest rise
3. Position - flat surface, open airway - air sniffing position, jaw thrust/chin lift, look, listen and feel, reassess respiratory efforts, breath sounds, skin color	3. Airway open, RR=0, no chest rise observed, no spontaneous respirations noted, cyanotic
4. Begin PPV with BVM with oral airway and 100% oxygen, rate 20 –24, assess breath sounds, chest rise <b>(Give first two breaths rapidly without oxygen)</b>	4. Patient has no gag reflex, chest rise present but minimal, breath sounds diminished, increased effort needed to bag patient, skin cyanotic
5. Modify method of PPV, increase pressure, disable pop-off valve, better mask seal, reposition head	5. After pop-off valve is disabled greater ventilation pressures possible, chest rise improves, breath sounds clear & equal, skin still cyanotic

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| 6. Assess circulation: brachial pulse, assess skin color/temp, and CRT            | 6. Absent brachial pulse, skin slightly cyanotic, cold, CRT=5 seconds, <b>Cardiac Arrest</b>  |
| 7. Begin compressions with proper technique and rate = 100, (5:1), depth=1-1 1/2" | 7. Adequate compressions, brachial pulse felt during compressions   |
| 8. Reassess ABC's after 1 minute  | 8. Airway open, RR=0, absent respiratory effort, carotid pulse=0 bpm  |
| 9. Continue CPR with BVM and 100% O2  | 9. Brachial pulses felt with compressions, color improving, good chest rise with ventilations   |
| 10. Note mental/neuro status (AVPU), assess pupils, muscle tone                   | 10. Unresponsive to painful stimuli, flaccid, pupils dilated, extremely slow to respond   |
| 11. Load and go   | 11. <b>Cardiac Arrest Secondary to Drowning</b>   |
| 12. Reassess ABC's and Mental/neuro status (always reassess after moving patient) | 12. No improvement in patient's condition   |
| 13. After 5 minutes reassess patient's ABC's and mental/neuro status              | 13. Improvement in patient's condition, brachial pulses weak, HR=80 bpm, CRT=4 seconds, RR=0, unresponsive to pain, skin pale, cool, diaphoretic <b>(Stop Compressions)</b> |
| 14. Continue PPV with BVM and 100% oxygen   | 14. Good chest rise, breath sounds equal & clear, skin pinkening up   |

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| 15. | Reassess airway, respiratory effort<br>circulation, skin color/temp, CRT,<br>LOC   | 15. | Airway open, RR=0, brachial<br>pulses stronger, HR=110 bpm,<br>skin pinking up, cool, dry, CRT=2,<br>unresponsive to painful stimuli                         |
| 16. | Detailed assessment: head to toe<br>examination - head, neck, chest,<br>abdomen, pelvis, upper extremities,<br>lower extremities | 16. | No obvious conditions/problems<br>observed (rash, injuries, etc.)  |
| 17. | Keep patient warm  | 17. | Dry & cover patient with a blanket   |
| 18. | Chemstrip  | 18. | Chemstrip 50   |
| 19. | Continue to assist ventilations<br>with BVM and 100% O <sub>2</sub>  | 19. | Good chest rise, breath sounds<br>equal & clear, skin pinking up   |
| 20. | Reassess PRN   | 20. | LOC=unresponsive<br>Pupils=equal & reactive<br>Airway=open & clear<br>Breathing=0<br>Pulse=110 bpm, radial, strong<br>Skin=pink, warm & dry<br>CRT=2 seconds |

### **Knowledge Points:**

- 1. The large majority of pediatric cardiopulmonary arrests are unwitnessed respiratory arrests.**
- 2. Respiratory distress and arrest are the leading causes of cardiopulmonary arrest in children.**
- 3. If respiratory distress is allowed to progress to respiratory arrest, hypoxia and acidosis often prevent the heart from responding to the interventions that may start it beating again. It is vital that respiratory distress be recognized early, and prevented from progressing. The recovery potential for the pediatric heart, decreases with every minute inadequate oxygenation continues.**
- 4. High concentrations of oxygen and/or positive pressure ventilation must be administered to any child that is hypoventilating. This will prevent the patient from progressing to respiratory and/or cardiac arrest.**
- 5. Chest rise is the most adequate measuring tool for proper ventilation.**
- 6. Positive pressure ventilations are delivered with a slow inspiratory time and low pressures. Ventilation should be performed just until adequate chest rise is evident. This will prevent over inflation of the lungs, and potential injury to the lungs.**
- 7. If the heart rate drops below 60 bpm, in the infant, and below 40 bpm, in the older child. compressions should be started.**
- 8. After every fifth compression, there should be a pause to allow for adequate chest rise with each ventilation.**

**Megacode Scenario - 3**  
(Hypovolemia/Septic Shock)

You are called to the home of a three-year-old girl because "she is very sick".

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number of Patients, Additional Resources, Scene Safety	1. Patient supine in bed, no spontaneous movement, looks very ill, rash on body, 1 patient, scene is safe, 15 minute ETA on ALS unit
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, respiratory effort, audible breath sounds, LOC	2. Opens eyes when shaken, unresponsive to pain, no spontaneous movement, RR=30, partial airway obstruction – grunting and gurgling sounds from airway
3. Position - flat surface, open airway - air sniffing position, jaw thrust/or chin lift, tongue look, listen and feel, reassess respiratory effort, assess breath sounds, skin color	3. Partial airway obstruction - fluid, RR=30 grunting and gurgling, increased work of breathing, skin cool, diaphoretic covered with rash, (petechiae/purpura), pale, dusky around mouth, breath sounds equal & clear
4. Suction airway, Oxygen 6 – 10 lpm by non re-breather	4. Airway clear, expiratory grunt RR=30, skin pinkening up, breath sounds equal & clear, good chest rise
5. Assess circulation: radial/brachial pulse, assess skin color/temp, CRT	5. HR=250 bpm, weak brachial, mottling to extremities, cool diaphoretic, CRT=5 seconds

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| 6.  | Note mental/neuro status (AVPU), assess pupils, muscle tone  | 6.  | Unresponsive to painful stimuli, pupils dilated, sluggish to respond, flaccid  |
| 7.  | Load and go  | 7.  | <b>Hypovolemia/Septic Shock</b>  |
| 8.  | Reassess ABC's and mental/neuro status (always reassess after moving patient)  | 8.  | Airway open, RR=30, good chest rise, work of breathing decreasing, brachial pulses < 200 bpm, skin pinkening up, cool, dry, CRT=3 seconds, responsive to voice |
| 9.  | Continue 100% oxygen via non re-breather mask  | 9.  | Good chest rise, breath sounds equal & clear, skin pinkening up  |
| 10. | Reassess airway, respiratory effort, circulation, skin color/temp, CRT, LOC  | 10. | Airway open, RR=24, no increased work of breathing, radial pulse=180 bpm, B/P 70/64, skin cool, dry, CRT=3 seconds, responsive to voice                        |
| 11. | Detailed assessment: head to toe examination - head, neck, chest abdomen, pelvis, lower extremities, upper extremities | 11. | No other obvious conditions/problems observed  |
| 12. | Keep patient warm  | 12. | Cover patient with blanket   |
| 13. | Chemstrip  | 13. | Chemstrip=80   |
| 14. | Continue to deliver O2 100% via non re-breather mask   | 14. | Good chest rise, breath sounds equal & clear, RR=24, skin pinkening up   |

15. Reassess PRN

15. LOC=responds to voice  
Pupils=equal & reactive  
Airway=open & clear  
Breathing=24, non labored  
Pulse=180 bpm, radial, strong  
Skin=pink, warming up  
CRT=3 seconds

### **Knowledge Points:**

1. **After respiratory distress, shock is the most frequent cause of cardiopulmonary arrest in the pediatric patient. It is always considered a load-and-go situation.**
2. **The child's ability to constrict arteries and veins is much better than the adult. Because of this ability, they compensate for blood loss much better than the adult does. A normal or near normal blood pressure in the face of blood loss is a very common occurrence in children. In a trauma situation, a normal blood pressure in a child, does not rule out shock in children.**
3. **Shock in the pediatric patient is most often due to volume loss or mal-distribution of circulatory volume.**
4. **Capillary refill time and peripheral pulses are the most reliable indicators for assessing circulation in a child.**
5. **Obtaining a reliable blood pressure in the pediatric patient can be very difficult. It is important to use the correct sized blood pressure cuff. The sounds heard when obtaining a blood pressure are difficult to hear in the pediatric patient. Normal blood pressures vary with the age of the child. The caregiver must be familiar with the normal ranges of all age groups of pediatric patients in order to properly interpret the blood pressure readings. If an appropriate sized cuff is available, a blood pressure should be taken as a baseline and then repeated periodically to measure for a trend.**
6. **In the presence of a head injury, shock will be the leading cause of death. If the patient has a head injury and severe bleeding, it is important to treat the shock first.**
7. **Distributive shock can be caused by two primary reasons in the pediatric patient:**
  - ♦ **Hypovolemia - circulation volume loss due to bleeding or dehydration**
  - ♦ **Mal-Distribution - circulating volume is pooled in a larger vascular space because of vasodilation caused by a toxic substance - infection (sepsis) or a allergen (anaphylaxis)**
8. **Anaphylaxis occurs when the child is exposed to an allergen. They will appear very ill, have a sudden onset of wheezing, and have a blotchy rash that itches (hives/urticaria). The allergen eventually causes massive vasodilation resulting in shock.**
9. **Sepsis is a severe infection that reaches the blood stream and results in massive vasodilation and shock. The child will be cool instead of hot and will have a fine rash called petechiae or purpura. The child usually has a history of being ill for several days.**
10. **Dehydration can lead to shock because the patient loses large amounts of fluid by sweating, or massive vomiting and/or diarrhea. The child is usually too ill to take in enough fluids to counteract the loss of fluid.**

**Megacode Scenario - 4**  
(Bradycardia/Hypoxia)

You are dispatched to the home of a four-year-old child. Mother states, "she's been sick for a couple of days."

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Responses</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number of Patients, Additional Resources, Scene Safety	1. Child is awake but lethargic, sitting in a chair, increased work of breathing, 1 patient, scene is safe, ALS unit delayed 20 minutes
2. Assess general appearance from a distance, assess spontaneous movements, establish (un)responsiveness, assess airway, respiratory, audible breath sounds, LOC	2. Awake but sitting slumped down in chair, looks very ill, moves spontaneously, airway open, moderate retractions, no audible breath sounds, no resistance to examination
3. Position - sitting up, reassess respiratory effort, breath sounds, skin color	3. RR=16, shallow, moderate retractions, light crackles bilaterally, pale
4. Administer 6 - 10 liters oxygen via non re-breather mask	4, Patient accepts mask, airway open, retractions, increased work of breathing, light crackles bilaterally, pale, LOC decreasing, RR=8
5. Position - flat surface, open airway air sniffing position, jaw thrust/chin lift, look listen and feel, reassess respiratory effort, assess to breath sounds, skin color	5. Patient doesn't resist, airway open, RR=8, shallow, inadequate chest rise, crackles bilaterally, pale, cyanotic around mouth

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| <p>6. Assist ventilation via BVM with 100% oxygen with oral airway</p> <p>7. Assess circulation: radial/brachial pulses, assess skin color/temp, CRT</p> <p>8. Note mental/neuro status (AVPU), assess pupils, muscle tone</p> <p>9. Load and go</p> <p>10. Reassess ABC's and mental/neuro status (always reassess after moving patient)</p> <p>11. Continue PPV with BVM and 100% oxygen</p> <p>12. Reassess airway, respiratory effort, circulation, skin color/temp, CRT, LOC</p> | <p>6. Patient doesn't resist, airway open, inadequate chest rise, RR=8, crackles bilaterally, airway resistance, no change with repositioning of airway, pale, cyanosis around mouth, patient becomes unresponsive</p> <p>7. HR=64 bpm, brachial only, pale cool, diaphoretic, CRT=4 seconds</p> <p>8. Unresponsive to voice, responsive to pain, pupils equal, sluggish to respond, flaccid</p> <p>9. <b>Bradycardia Secondary to Hypoxia/Respiratory Distress</b></p> <p>10. Airway open, RR=8, good chest rise, brachial pulse 90 bpm, skin pinkening up, CRT=3</p> <p>11. Good chest rise, breath sounds equal and clear, skin pinkening up</p> <p>12. Airway open, RR=12, radial pulse=90 bpm, skin cool, pink, CRT=3 seconds, responds to voice</p> |
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| 13. | Detailed assessment: head to toe, examination - head, neck, chest abdomen, lower extremities, upper extremities | 13. | No other obvious conditions or problems observed   |
| 14. | Keep patient warm   | 14. | Cover patient with blanket   |
| 15. | Chemstrip   | 15. | Chemstrip=30   |
| 16. | Continue to deliver PPV with BVM and 100% O2  | 16. | Good chest rise, breath sounds equal & clear, RR=12, skin pink, dry  |
| 17. | Reassess PRN  | 17. | LOC=responds to voice<br>Pupils=equal & reactive<br>Airway=open & clear<br>Breathing=12 and shallow<br>Pulse=90 bpm, radial<br>Skin=pink, warm, dry<br>CRT=3 seconds |

### **Knowledge Points:**

- 1. The large majority of pediatric cardiopulmonary arrests are unwitnessed respiratory arrests.**
- 2. Respiratory distress and arrest are the leading causes of cardiopulmonary arrest in children.**
- 3. If respiratory distress is allowed to progress to respiratory arrest, hypoxia and acidosis often prevent the heart from responding to the interventions that may start it beating again. It is vital that respiratory distress be recognized early, and prevented from progressing. The recovery potential for the pediatric heart, decreases with every minute inadequate oxygenation continues.**
- 4. High concentrations of oxygen and/or positive pressure ventilation must be administered to any child that is hypoventilating. This will prevent the patient from progressing to respiratory and/or cardiac arrest.**
- 5. Chest rise is the most adequate measuring tool for proper ventilation.**
- 6. Positive pressure ventilations are delivered with a slow inspiratory time and low pressures. Ventilation should be performed just until adequate chest rise is evident. This will prevent over inflation of the lungs, and potential injury to the lungs.**
- 7. If the heart rate drops below 60 bpm, in the infant, and below 40 bpm, in the older child, compressions should be started.**
- 8. After every fifth compression, there should be a pause to allow for adequate chest rise with each ventilation.**

**Megacode Scenario - 5**  
(Hypovolemia/Dehydration)

You are dispatched to the scene of an eight-month-old child with a two-day history of vomiting and diarrhea.

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-UP, PPE/BSI, Determine Type of Medical Emergency, Number of patients, Additional Resources Scene safety	1. Patient lying in a crib, eyes dull, sunken, child listless, limp, 1 patient, scene safe, 15 minute ETA on transport unit
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, respiratory effort, audible breath sounds, LOC	2. Awake, lethargic, listless, eyes dull, sunken, don't focus on objects, minor spontaneous movement, airway open & clear, shallow respirations, no retractions, no audible breath sounds, no resistance to exam
3. Position – flat surface, open airway - sniffing position, jaw thrust/chin lift, look, listen and feel, reassess respiratory efforts, assess breath sounds, skin color	3. Patient doesn't resist exam, airway open, responds to voice only, RR=36, shallow, no retractions, minor chest rise, breath sounds equal & clear, skin color pale, diaphoretic
4. Administer 6 – 10 liters oxygen via partial re-breather mask	4. Patient accepts mask, airway open & clear, RR=36, moderate chest rise, breath sounds equal & clear, skin pale
5. Assess circulation: radial/brachial pulses, assess skin color/temp, CRT	5. HR=200 bpm, brachial only, skin pale, cool, diaphoretic, CRT=4 seconds

- |     |   |     |   |
|-----|---|-----|---|
| 6.  | Note mental/neuro status (AVPU), assess pupils, muscle tone, response to painful stimuli, fontanel              | 6.  | Responsive to voice, no spontaneous movement, pupils equal & sluggish, fontanel soft  |
| 7.  | Reassess airway and respiratory effort, breath sounds, skin color   | 7.  | Airway open, slight, improvement in respiratory effort, RR=32, adequate chest rise, breath sounds equal & clear, skin pinking up  |
| 8.  | Reassess circulation: skin color/temp, brachial/radial pulses, CRT  | 8.  | Moderate improvement, HR=180 bpm, weak brachial pulse, skin pinking up, CRT=3   |
| 9.  | Load and go   | 9.  | <b>Hypovolemic Shock<br/>Secondary to Dehydration</b>   |
| 10. | Keep patient warm   | 10. | Cover patient with a blanket  |
| 11. | Reassess ABC's and mental/neuro status (always reassess after moving patient)                                   | 11. | Patient continues to improve, opens eyes, more alert with spontaneous movement, pupils equal and reactive, RR=32, good chest rise, HR=160 bpm, radial, skin pink, warm & dry, CRT=3 |
| 12. | Detailed assessment: head to toe examination – head, neck, chest, abdomen, lower extremities, upper extremities | 12. | No other obvious problems observed  |
| 13. | Continue to deliver O2 100% via partial re-breather mask  | 13. | Good chest rise, breath sounds equal & clear, RR=24, skin pink, warm & dry  |

14. Reassess PRN

14. LOC=opens eyes to voice  
Pupils=equal & reactive  
Airway=open & clear  
Breathing=32, non-labored  
Pulse=160 bpm, radial, strong,  
Skin=pink, warm, dry, CRT=2

**Knowledge Points:**

1. **After respiratory distress, shock is the most frequent cause of cardiopulmonary arrest in the pediatric patient. It is always considered a load-and-go situation.**
2. **The child's ability to constrict arteries and veins is much better than the adult. Because of this ability, they compensate for blood loss much better than the adult does. A normal or near normal blood pressure in the face of blood loss is a very common occurrence in children. In a trauma situation, a normal blood pressure in a child, does not rule out shock in children.**
3. **Shock in the pediatric patient is most often due to volume loss or mal-distribution of circulatory volume.**
4. **Capillary refill time and peripheral pulses are the most reliable indicators for assessing circulation in a child.**
5. **Obtaining a reliable blood pressure in the pediatric patient can be very difficult. It is important to use the correct sized blood pressure cuff. The sounds heard when obtaining a blood pressure are difficult to hear in the pediatric patient. Normal blood pressures vary with the age of the child. The caregiver must be familiar with the normal ranges of all age groups of pediatric patients in order to properly interpret the blood pressure readings. If an appropriate sized cuff is available, a blood pressure should be taken as a baseline and then repeated periodically to measure for a trend.**
6. **In the presence of a head injury, shock will be the leading cause of death. If the patient has a head injury and severe bleeding, it is important to treat the shock first.**
7. **Distributive shock can be caused by two primary reasons in the pediatric patient.**
  - ♦ **Hypovolemia - circulation volume loss due to bleeding or dehydration**
  - ♦ **Mal-Distribution - circulating volume is pooled in a larger vascular space because of vasodilation caused by a toxic substance - infection (sepsis) or an allergen (anaphylaxis)**
8. **Anaphylaxis occurs when the child is exposed to an allergen. They will appear very ill, have a sudden onset of wheezing, and have a blotchy rash that itches (hives/urticaria). The allergen eventually causes massive vasodilation resulting in shock.**
9. **Sepsis is a severe infection that reaches the blood stream, it will result in massive vasodilation and shock. The child will be cool instead of hot and will have a fine rash called petechiae or purpura. The child usually has a history of being ill for several days.**
10. **Dehydration can lead to shock because the patient loses large amounts of fluid by sweating, or massive vomiting and/or diarrhea. The child is usually too ill, to take in enough fluids, to counteract the loss of fluid.**

# **MEDICAL DECISIONS**

## **Objectives:**

1. To reinforce pediatric physical assessment technique.
2. To demonstrate the stepwise approach to the child in respiratory distress:
  - a. severity?
    - b. positioning?
    - c. oxygen?
    - d. airway obstruction?
    - e. management?
3. To review the possible management options when confronted with a child with wheezing or stridor.
4. To review techniques when dealing with distressed parents:
  - a. "yes, but..."
  - b. distraction/redirection
  - c. reassurance
  - d. discovering and offering recognition of hidden agendas
5. To review the approach to the child with an altered mental status.
6. To review the identification and appropriate field management of seizures in pediatric patients.

## **Time:**

60 minutes

## **Students:**

18 students/station

## **Instructors:**

1 or 2 instructors

## **Facility:**

A room with chairs directed toward a stretcher or high table and chair.

**Equipment:**

- \*1 doll the size of a toddler
- \*1 resusci-baby
- \*1 jump kit (stethoscope, oxygen tubing, oxygen mask, BVM unit with assorted sized masks, oral/nasal airways, nasal cannula, Yankauer suction catheter, gloves, pen light, tape, dressings and bandages, ace wrap, pediatric blood pressure cuff
- \*1 paper cup
- \*1 plastic toy with a small part broken off
- \*1 nurse's cap
- \*1 physician's lab coat
- \*1 tape recording of stridor (2 minutes) and wheezing (2 minutes)
  
- \*Props suggestive of a neglectful home environment for Scenario V (such as empty alcoholic beverage containers, toy mouse, etc.)

### **Organization:**

Case scenarios are presented. Chose members of the class to play the role of the parents. Have them act out the behavior of the parents. This will add some fun and reality to the scenario practice.

For each scenario, two students are chosen to play their usual roles as rescuers and manage the situation, as acted out by their peers. Each scenario is designed to last approximately 5-10 minutes. The instructors may occasionally need to intercede, with prompts, in order to remain within an appropriate time frame. For example, distracting activities such as an upset parent may need to be controlled. The audience may need to be asked to provide suggestions to the managing rescuers. After each scenario, the students in the "audience" are asked to critique the management they observed. In the discussion that ensues, the instructor brings out the major teaching points of each scenario. **Great care must be taken to protect insecure or faltering students, who are playing the role of rescuers, from embarrassing situations in front of their peers. This is accomplished by being somewhat selective in choosing "volunteers", using appropriate humor to "break-the-ice", and rewarding correct actions with many positive comments.**

Since the child is represented by a doll, the instructor can provide certain sound effects (using his/her own voice or an audio tape), and answer selected queries from the First Responders regarding the child's physical examination that cannot be acted out (examples: respiratory rate = 40, retracting is moderate).

## **Medical Scenario - 1**

(Respiratory Distress - Croup)

You are called to the scene of a 3-year-old child in respiratory distress. Both parents are on the scene.

### **Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number of Patients, Additional Resources, Scene Safety	1. Child crying, clinging to mother, in obvious respiratory distress, Mother crying, upset, Father yelling "Get him to the hospital quickly", 1 patient, potential for unsafe scene if parents aren't interacted with properly, all responding units are busy
<u>Rescuer #1</u>	
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, breathing, respiratory effort, for audible breath sounds, LOC (AVPU)	2. #1 Alert, spontaneous movements, "seal barky" cough, <b>STRIDOR</b> , nasal flaring, increased work of breathing, ask mother to lift shirt, moderate retractions, doesn't appear ill
<u>Rescuer #2</u>	
That's just what we are going to do, as soon as we determine the safest way to do what you are asking us to do."	#2 move father away (upsetting child), expressing agreement Express direct acknowledgement of parent's anxiety, calming response, avoid involvement in a conflict
3. Position – allow child to choose, approach in a squatting position, assess respiratory effort, for drooling, skin color	3. With child in mother's arms/lap <b>(utilize mother's help, ask her to lift child's shirt again)</b> ask her to help calm child, RR=40, moderate retractions, nasal flaring
4. Offer oxygen in various forms until	4. Begin by offering partial re-breather

patient accepts some form of oxygen <b>(DO NOT FORCE)</b>		mask, child refuses, nasal cannula, child refuses, finally accepts oxygen tube through paper cup, 6 lpm, will let mother hold cup to its face
5.	Assess breath sounds, skin color, (warm stethoscope), solicit mother's help, approach from behind	5. Child cries if you approach with stethoscope, instruct mother how to place stethoscope on back, instruct to approach from behind, breath sounds clear bilaterally, skin pink
6.	Assess circulation: brachial/radial pulses, skin color/temp, CRT	6. Brachial pulse=120 bpm, skin, pink, warm, dry, CRT=3 seconds
7.	Note mental/neuro status (AVPU), assess pupils, muscle tone, response to painful stimuli	7. Alert, some fatigue, eyes bright, focuses on objects, easily consoled by mother, moves all extremities well, defer checking pupils so as to not upset child, good muscle tone
8.	Reassess airway and respiratory efforts, breath sounds, skin color	8. Still "seal barky" cough, minor <b>STRIDOR</b> , still retracting, RR=40, retractions, nasal flaring, breath sounds noisy, skin pink
9.	Reassess circulation: brachial/radial pulses, skin color/temp, CRT	9. Brachial pulse, HR=120 bpm, strong, skin pink, warm, dry, CRT=3 seconds
10.	Load and go	10. <b>Respiratory Distress - Croup</b>
11.	Provide cool environment	11. Do not warm ambulance
12.	Reassess ABC's and mental/neuro status <b>(always reassess after moving patient)</b>	12. Airway partial obstruction – <b>STRIDOR</b> , RR=40, labored, retractions, nasal flaring, brachial pulses strong, HR=120 bpm, alert, sleepy, eyes bright, easily consoled/distracted by mother, moves all extremities
13.	Detailed assessment – toe to head,	13. No other obvious conditions are

examination – head, neck, chest,  
abdomen, lower extremities, upper  
extremities

discovered

14. Reassess PRN, take SAMPLE history

14. LOC=alert, eyes bright, easily  
consoled  
Pupils=differed  
Airway=mild stridor, retractions  
Breathing=40, labored  
Pulse=120, brachial strong  
Skin=pink, warm, dry  
CRT=3 seconds  
S=sick with a cold for the last two  
days been getting harder to breath over  
the last couple of hours, low grade  
fever, retractions, nasal flaring, RR=40,  
minor **STRIDOR**  
A=none  
M=Dimetapp  
P=cold for a couple of days  
L=supper  
E=sick with cold for a couple of  
days

15. Continue to support respirations,  
mom and child

15. 6 liters of oxygen through oxygen  
tubing and paper cup, have mom walk  
patient outside

### **Knowledge Points:**

1. **65 % of all cardiopulmonary arrests in the pediatric age group are related to respiratory causes.**
2. **Four of the eight most common non-traumatic pediatric conditions resulting in admission to a hospital involve the respiratory system.**
3. **Often treatment must begin before the cause of the emergency can be diagnosed. In the pediatric patient, a delay in oxygenation, could be the difference in the child surviving.**
4. **The single most important intervention that can be performed for the pediatric patient is to open the airway.**
5. **Because of the small nature of the child's airway, the airway should be placed in the sniffing or neutral position. This prevents a collapse of the airway.**
6. **There are four primary respiratory emergencies encountered with the pediatric patient:**
  - ♦ **Foreign Body Airway Obstruction - Children will put anything in their mouths. If a FBAO is suspected and the child is still able to pass air, do not intervene. Even if respirations sound noisy, trying to remove the obstruction might force it further down in the airway. This could turn a partial obstruction into a complete obstruction.**
  - ♦ **Croup - A viral infection of the trachea. It usually affects older infants and toddlers less than 3 years old. It does occur in older children sometimes. The child with croup usually has a gradual onset of dyspnea, has a low grade fever, does not appear sick, has a "seal barky" cough and stridor. The patient will benefit from cool air. Agitation of the patient should be avoided as it could make the obstruction worse.**
  - ♦ **Epiglottitis - Is a more serious cause of airway obstruction. It has a potential for rapid progression to complete obstruction. It is a bacterial infection of the epiglottitis. It is usually seen in children older than two years old. The child usually has a high grade fever, and appears very ill. The child will choose to lean forward on their arms, "tripoding", and will drool because their throat is so painful it hurts to swallow. They will have stridor. The potential for the child to experience a sudden complete airway obstruction is high. It is extremely important to keep the patient calm and do nothing that might stimulate the airway.**
  - ♦ **Asthma - Obstruction of the smaller airways deep in the lungs. Usually causes bronchospasms that result in wheezing. It is most often caused by an allergy. It can usually be differentiated from FBAO because asthma is usually a gradual process.**
7. **Regardless of the cause, children in respiratory distress should be managed the same way:**
  - **Offer oxygen if tolerated**
  - **Keep the child calm**
  - **Position to optimize breathing**
  - **Begin positive pressure ventilations for apnea, gasping or cyanosis that develops in spite of being given oxygen**

## **Medical Scenario - 2**

**(Foreign Body Airway Obstruction)**

You arrive on the scene to find a 1 1/2-year-old child who has developed a sudden onset of severe respiratory distress. Parents are criticizing each other for letting their child play with small toys.

### Expected Responses:

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number of Patients, Additional Resources, Scene Safety	1. Child in mothers lap, obvious respiratory distress, parents upset with each other, blaming each other for child's problem, potential for unsafe scene if parents not interacted with properly, 1 patient , ETA on transport unit is 10 minutes
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, respiratory effort, audible breath sounds, LOC (AVPU)	2. Alert, eyes bright, easily consoled, moving all extremities, minor nasal flaring, increased work of breathing, obvious minor retractions, no audible breath sounds
<u>Rescuer #1</u>	
3. Position – allow child to choose, assess airway, reassess respiratory effort assess breath sounds, respiratory rate, skin color/temp <b>(utilize mother's help, ask her to lift child's shirt, also ask for assistance keeping child calm)</b>	#1. With child in mother's lap/arms, approach child in a squatting position, assess respiratory effort after shirt is lifted, no cyanosis, no drooling, <b>WHEEZING</b> on the R side, RR=36, minor retractions & nasal flaring, skin warm & dry
<u>Rescuer #2</u>	#2. Direct father to find a toy similar to the one aspirated by the child
4. Offer oxygen in various forms until patients accepts some form of oxygen <b>(DO NOT FORCE)</b>	4. Child refuses all forms of oxygenation
5. Assess breath sounds. (warm stethoscope), solicit mother's help,	5. Child cries if you approach with stethoscope, instruct mother how

	approach from behind		to place stethoscope on back, (instruct mother to approach from behind), <b>WHEEZING</b> heard on the R side
6.	Assess circulation: brachial/radial pulses, skin color/temp, CRT	6.	Brachial pulse 132 bpm, skin pink warm, dry, CRT=2 seconds
7.	Assess for obvious signs of external hemorrhage	7.	No obvious external hemorrhage
8.	Note mental/neuro status (AVPU), assess pupils, muscle tone, response to painful stimuli, fontanel	8.	Alert, eyes bright, focuses on objects, easily consoled by mother, moves all extremities well, defer checking pupils, as not to upset child, good muscle tone, soft fontanel
9.	Reassess airway and respiratory efforts, breath sounds, skin color	9.	Minor nasal flaring & retractions, RR=36, R sided <b>WHEEZING</b> , skin pink, warm & dry
10.	Reassess circulation: brachial/radial pulses, skin color/temp, CRT	10.	Brachial pulse=132 bpm, strong, skin pink, warm, dry, CRT=2 seconds
11.	Load and go	11.	<b>Foreign Body Airway Obstruction</b>
12.	Reassess ABC's and mental/neuro status ( <b>always reassess after moving patient</b> )	12.	Airway partially obstructed, RR=36, nasal flaring & retractions, increased work of breathing, R sided <b>WHEEZING</b> , brachial pulse, HR=132 bpm, skin pink, warm, dry, CRT=2 seconds, alert. eyes bright, easily distracted & consoled, moves all extremities
13.	Detailed assessment – toe to head, examination – head, neck, chest, abdomen, lower extremities, upper extremities	13.	No other obvious conditions are discovered
14.	Reassess PRN, take SAMPLE history	14.	LOC=alert, eyes bright, easily consoled Pupils=differed

Airway=partially obstructed  
Breathing=36  
Pulse=132 bpm, brachial  
Skin=pink, warm, dry  
CRT=2 seconds  
S=sudden onset of respiratory distress,  
missing toy, retractions & nasal flaring,  
RR=36, R sided **WHEEZING**  
A=penicillin  
M=none  
P=none  
L=lunch  
E=playing on the floor with small toy,  
toy now missing and child in distress

15. Continue to support respirations,  
child and parents

15. Child still refuses oxygen, leave in  
mothers lap in position child chooses,  
ask questions of parents to keep them  
distracted from fighting

**Knowledge Points:**

1. **65 % of all cardiopulmonary arrests in the pediatric age group are related to respiratory causes.**
2. **Four of the eight most common non-traumatic pediatric conditions resulting in admission to a hospital involve the respiratory system.**
3. **Often treatment must begin before the cause of the emergency can be diagnosed. In the pediatric patient, a delay in oxygenation, could be the difference in the child surviving.**
4. **The single most important intervention that can be performed for the pediatric patient is to open the airway.**
5. **Because of the small nature of the child's airway, the airway should be placed in the sniffing or neutral position. This prevents a collapse of the airway.**
6. **There are four primary respiratory emergencies encountered with the pediatric patient:**
  - ♦ **Foreign Body Airway Obstruction - Children will put anything in their mouths. If a FBAO is suspected and the child is still able to pass air, do not intervene. Even if respirations sound noisy, trying to remove the obstruction might force it further down in the airway. This could turn a partial obstruction into a complete obstruction.**
  - ♦ **Croup - A viral infection of the trachea. It usually affects older infants and toddlers less than 3 years old. It does occur in older children sometimes. The child with croup usually has a gradual onset of dyspnea, has a low grade fever, does not appear sick, has a "seal barky" cough and stridor. The patient will benefit from cool air. Agitation of the patient should be avoided as it could make the obstruction worse.**
  - ♦ **Epiglottitis - Is a more serious cause of airway obstruction. It has a potential for rapid progression to complete obstruction. It is a bacterial infection of the epiglottitis. It is usually seen in children older than two years old. The child usually has a high-grade fever, and appears very ill. The child will choose to lean forward on their arms, "tripoding", and will drool because their throat is so painful it hurts to swallow. They will have stridor. The potential for the child to experience a sudden complete airway obstruction is high. It is extremely important to keep the patient calm and do nothing that might stimulate the airway.**
  - ♦ **Asthma - Obstruction of the smaller airways deep in the lungs. Usually causes bronchospasms that result in wheezing. It is most often caused by an allergy. It can usually be differentiated from FBAO because asthma is usually a gradual process.**
7. **Regardless of the cause, children in respiratory distress should be managed the same way:**
  - **Offer oxygen if tolerated**
  - **Keep the child calm**
  - **Position to optimize breathing**
  - **Begin positive pressure ventilations for apnea, gasping or cyanosis that develops in spite of being given oxygen**

### **Medical Scenario - 3** **(Epiglottitis)**

You respond to a 3-year-old child who suddenly develops difficulty in breathing. Mother on scene.

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number Of Patients, Additional Resources, Scene Safety	1. Child sitting next to mother on couch, leaning forward on both arms (tripod), in moderate respiratory distress, Mother calm & cooperative, 1 patient, scene is safe, all responding units are tied up on other calls
2. Assess general appearance from a distance, assess spontaneous respirations, assess airway, respiratory effort, audible breath sounds, LOC (AVPU)	2. Alert, spontaneous movements, ill in appearance, eyes dull, drooling respiratory distress, <b>STRIDOR</b> , nasal flaring & retractions, increased work of breathing, tripoding
3. Position – allow child to choose, reassess respiratory effort, assess breath sounds, respiratory rate, skin color/temp <b>(utilize mothers help, ask her to lift child's shirt, also ask for assistance in keeping child calm)</b>	3. Approach child from a squatting position, patient doesn't resist, assess respiratory effort after shirt is lifted, severe retractions, nasal flaring, tripoding, clear breath sounds, RR=36, skin pale, cyanotic around mouth, warm, dry
4. Administer 6 - 10 liters of oxygen by non re-breather mask	4. Patient accepts NRM from mother if she holds it to his face
5. Assess circulation: brachial/radial pulses, skin color/temp, CRT	5. Brachial pulse=140 bpm, skin pale, cyanotic around mouth, CRT=3 seconds
6. Assess for obvious signs of external hemorrhage	6. No obvious external hemorrhage
7. Note mental/neuro status (AVPU), assess pupils, muscle tone, response to painful stimuli,	7. Child listless, fatigued, alert, doesn't resist rescuer's presence/actions, eyes dull but focus on objects, moves all

- |     |   |  |
|-----|---|--|
|     |   | extremities well, consolable, pupils equal & reactive, good muscle tone  |
| 8.  | Reassess airway and respiratory efforts, breath sounds, skin color  | 8. <b>STRIDOR</b> , nasal flaring, moderate retractions, breath sounds clear bilaterally, RR=42, moderate increased work of breathing, skin pale, cyanosis resolved                    |
| 9.  | Reassess circulation: brachial/radial pulses, skin color/temp, CRT  | 9. Brachial pulse=140 bpm, strong, skin pale, warm, dry, CRT=3 seconds   |
| 10. | Load and go   | 10. <b>Epiglottitis</b>  |
| 11. | Keep patient calm, prepare BVM PRN  | 11. Patient's respiratory condition doesn't change   |
| 12. | Reassess ABC's and mental/neuro status ( <b>always reassess after moving patient</b> )                            | 12. <b>STRIDOR</b> , RR=40, nasal flaring, moderate retractions, clear breath sounds, increased work of breathing, brachial pulse=140 bpm, skin pinkening up, warm, dry, CRT=3 seconds |
| 13. | Detailed assessment – toe to head, examination – head, neck, chest, abdomen, lower extremities, upper extremities | 13. No other obvious conditions are discovered   |
| 14. | Reassess PRN, take SAMPLE history   | 14. LOC=listless, eyes dull, consolable<br>Pupils=equal & clear<br>Airway=partial obstruction, <b>STRIDOR</b>  |

Breathing=40, retractions, nasal  
flaring, increased work of breathing  
Pulse=140 bpm, brachial  
Skin=pale, warm, dry  
CRT=3 seconds  
S=sudden onset with fever & sore throat  
A=Asprin  
M=Tylenol  
P=none  
L=supper  
E=feeling fine until this evening

15. Continue to support respirations,  
child and Mother

15. Child continues to accept oxygen,  
mother keeps child calm

### **Knowledge Points:**

1. **65 % of all cardiopulmonary arrests in the pediatric age group are related to respiratory causes.**

2. Four of the eight most common non-traumatic pediatric conditions resulting in admission to a hospital involve the respiratory system.
3. Often treatment must begin before the cause of the emergency can be diagnosed. In the pediatric patient, a delay in oxygenation, could be the difference in the child surviving.
4. The single most important intervention that can be performed for the pediatric patient is to open the airway.
5. Because of the small nature of the child's airway, the airway should be placed in the sniffing or neutral position. This prevents a collapse of the airway.
6. There are four primary respiratory emergencies encountered with the pediatric patient:
  - ♦ Foreign Body Airway Obstruction - Children will put anything in their mouths. If a FBAO is suspected and the child is still able to pass air, do not intervene. Even if respirations sound noisy, trying to remove the obstruction might force it further down in the airway. This could turn a partial obstruction into a complete obstruction.
  - ♦ Croup - A viral infection of the trachea. It usually affects older infants and toddlers less than 3 years old. It does occur in older children sometimes. The child with croup usually has a gradual onset of dyspnea, has a low grade fever, does not appear sick, has a "seal barky" cough and stridor. The patient will benefit from cool air. Agitation of the patient should be avoided as it could make the obstruction worse.
  - ♦ Epiglottitis - Is a more serious cause of airway obstruction. It has a potential for rapid progression to complete obstruction. It is a bacterial infection of the epiglottitis. It is usually seen in children older than two years old. The child usually has a high grade fever, and appears very ill. The child will choose to lean forward on their arms, "tripoding", and will drool because their throat is so painful it hurts to swallow. They will have stridor. The potential for the child to experience a sudden complete airway obstruction is high. It is extremely important to keep the patient calm and do nothing that might stimulate the airway.
  - ♦ Asthma - Obstruction of the smaller airways deep in the lungs. Usually causes bronchospasms that result in wheezing. It is most often caused by an allergy. It can usually be differentiated from FBAO because asthma is usually a gradual process.
7. Regardless of the cause, children in respiratory distress should be managed the same way:
  - Offer oxygen if tolerated
  - Keep the child calm
  - Position to optimize breathing
  - Begin positive pressure ventilations for apnea, gasping or cyanosis that develops in spite of being given oxygen

#### **Medical Scenario - 4**

(Altered Level of Consciousness - Seizure)

As you arrive on the scene, the mother of a 1-year-old infant meets you at the door screaming,

"My baby won't wake up, My baby won't wake up."

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number Of Patients, Additional Resources, Scene Safety	1. Mother hysterical, baby lying supine in crib, no spontaneous movement, no response to voice, 1 patient, ALS unit ETA is 15 minutes
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, respiratory effort, audible breath sounds, LOC (AVPU)	2. Child motionless in crib, doesn't respond to voice/loud noises, airway open & clear, RR=30, without increased work of breathing, retractions or nasal flaring, no audible sounds, eyes deviated to the right, normal breath odor
3. Position – flat surface, open airway, air sniffing position, jaw thrust/chin lift, look, listen and feel, reassess respiratory effort, assess breath sounds, skin color	3. Spontaneous respirations, RR=30, non labored, breath sounds equal & clear, skin pale, warm, dry
4. Begin PPV with BVM and 100% oxygen and oral airway, rate 24, assess breath sounds, chest rise, <b>(Give first two breaths rapidly without oxygen)</b>	4. Patient has no gag reflex, breath sounds equal & clear, good chest rise, skin pale
5. Assess circulation: brachial/radial pulses, skin color/temp, CRT	5. Brachial pulse=120 bpm, skin warm & dry, CRT=3 seconds
6. Assess for obvious signs of external hemorrhage	6. No obvious external hemorrhage
7. Note mental/neuro status (AVPU), assess pupils, muscle tone, response to painful stimuli, assess fontanel,	7. No response to verbal/loud noise stimuli, withdraws from pain, pupils dilated, sluggish to respond, flaccid,

## AEIOU-TIPS

fontanel soft, eyes deviated to the right  
 A=none  
 E=no stiff neck  
 I=see chemstrip below  
 O=none  
 U=none  
 T=none  
 I=no rash  
 P=none  
 S=shaking all over, eyes deviated to R

- |   |  |
|---|--|
| 8. Reassess airway and respiratory efforts, breath sounds, skin color   | 8. Airway open & clear, RR=30, with increased work of breathing, retractions or nasal flaring, breath sounds equal & clear, skin pinking up, warm, dry   |
| 9. Reassess circulation: brachial/radial pulses, skin color/temp, CRT   | 9. Brachial pulses 120 bpm, strong, skin pinking up, warm, dry, CRT=3 seconds  |
| 10. Load and go   | 10. <b>Altered Mental Status - Seizure</b>   |
| 11. Keep patient warm   | 11. Cover patient with blanket   |
| 12. Reassess ABC's and mental/neuro status ( <b>always reassess after moving patient</b> )                            | 12. Airway open & clear, RR=30, without increased work of breathing, retractions or nasal flaring, breath sounds equal & clear, brachial pulse strong, HR=120 bpm, skin pink, warm, dry, CRT=3 seconds, opens eyes to voice, muscle tone improving, pupils equal & reactive, eyes deviated to the right, fontanel soft |
| 13. Detailed assessment – head to toe, examination – head, neck, chest, abdomen, lower extremities, upper extremities | 13. No other obvious conditions discovered, except a fever, no evidence of trauma.   |

- |   |   |
|---|---|
| <p>14. Reassess PRN, take SAMPLE history</p>                                      | <p>14. LOC=gradually improving<br/>Pupils=equal &amp; clear<br/>Airway=open and clear<br/>Breathing=24, normal effort<br/>Pulse=120, brachial<br/>Skin=pink, warm,dry<br/>CRT=2 seconds<br/>S=running a fever all day, suddenly started shaking all over, then he wouldn't wake up<br/>A=none<br/>M=Tylenol<br/>P=none<br/>L=lunch<br/>E=runny nose, cold, fever of 104.2</p> |
| <p>15. Assess Chemstrip</p>   | <p>15. Chemstrip=100</p>  |
| <p>16. Continue to support respirations, child, and mother, keep patient warm</p> | <p>16. If patients level of consciousness continues to improve and gag reflex returns stop PPV, remove oral airway and place patient on a partial re-breather mask 6 - 10 liters per minute, place patient in the recovery position</p>   |

**Knowledge Points:**

1. The priorities for treatment of altered mental status in a child are:

- Assess ABC's
  - Grade the level of consciousness
  - Assess for the cause of altered mental status
2. The airway of the unconscious child is vulnerable due to a depressed gag reflex. The child becomes unable to protect its airway, from the aspiration of substances, into the lungs.
  3. The level of consciousness should be repeatedly graded by noting the child's eye, verbal and motor responses to verbal and painful stimuli.
  4. The AEIOU-TIPS acronym should be utilized to determine the condition that is causing the change in mental status.
    - ❖ A Alcohol Ingestion
    - ❖ E Encephalitis/Meningitis
    - ❖ I Insulin/Diabetes/Hypoglycemia
    - ❖ O Opiates/Poisons/Ingestions
    - ❖ U Uremia/Hypoxia/Hyperthermia/Hypothermia
    - ❖ T Trauma
    - ❖ I Infection/Sepsis
    - ❖ P Psychiatric/Emotional
    - ❖ S Seizures
  5. One in twenty children under the age of five will have at least one seizure in their lifetime, resulting from a high fever. Meningitis, poisoning, trauma or an inherited or acquired tendency for seizures (epilepsy) can also cause seizures. The important thing to remember is that in children, seizures can be very subtle. The typical tonic-clonic seizure or shaking all over will not always be present. Sometimes, all that is obvious is an altered mental status or the eyes will be deviated to one side. The first priority, as usual, is airway and breathing. Suction should also be ready, increased secretions are usually a problem during seizures. A high concentration of oxygen and positive pressure ventilations should be administered, if necessary. The patient should be placed in the recovery position, so as to allow for drainage of secretions. This will also keep the tongue from blocking the back of the throat. Protect the patient from hurting themselves during a seizure, by removing objects they may strike, during a seizure. Never force anything into their mouth, and never forcibly restrain the patient during a seizure.

### **Medical Scenario - 5**

(Altered Level of Consciousness - Head Injury/Child Abuse)

You are called to the scene of a six-month-old with respiratory distress.

## Expected Responses:

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number Of Patients, Additional Resources, Scene Safety	1. Child lying in crib, not moving, increased work of breathing, obvious multiple bruises observed, home unclean and disorderly, mother acts unconcerned, gives poor history, 1 patient, scene is safe, all unit busy, at least 20 minute wait for ALS unit
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, respiratory effort, audible breath sounds, LOC (AVPU)	2. Flaccid, non-moving, supine in crib, no response to voice or painful stimuli, snoring/grunting respirations, moderate increased work of breathing
3. Position – flat surface, open airway, air sniffing position, jaw thrust/chin lift, look, listen and feel, reassess respiratory effort, assess breath sounds, skin color, C-spine control	3. Snoring resolves, RR=28, breath sounds equal & clear, nasal flaring, moderate retractions, skin cyanotic, maintain C-spine control until patient is strapped/taped to a LBB
4. Begin PPV with BVM and 100% oxygen and oral airway, rate 40, assess breath sounds, chest rise, <b>(Give first two breaths rapidly without oxygen)</b>	4. Patient has no gag reflex, good chest rise, breath sounds equal & clear
5. Assess circulation: brachial/radial pulses, skin color/temp, CRT	5. Weak brachial pulse only, HR=120 bpm, skin cyanotic, cool, diaphoretic, CRT=5 seconds
6. Assess for obvious signs of external hemorrhage	6. No obvious external hemorrhage
7. Note mental/neuro status (AVPU),	7. Unresponsive to voice or pain,

<p>assess pupils, muscle tone, response to painful stimuli, fontanel, AEIOU-TIPS</p>		<p>pupils dilated, slow to respond, flaccid, no spontaneous movement, fontanel soft  A=none  E=no fever/neck stiffness  I=see below  O=none  U=hypoxia resolved  T=head injury  I=no fever  P=none  S=none</p>
8.	Reassess airway and respiratory efforts, breath sounds, skin color	8. Airway open, breath sounds equal & clear, good chest rise, skin pinkening up, cool, diaphoretic
9.	Reassess circulation: brachial/radial pulses, skin color/temp, CRT	9. Weak brachial pulses, HR=120 bpm, skin pinkening up, cool, diaphoretic
10.	Spinal immobilization with 3 or 4 straps, head immobilizer and tape, place pad under shoulders (include a cervical collar if appropriate size available)	10. Strap torso and legs to LBB before taping/strapping head to the board, if correct c-collar is not available, use towel roll and tape
11.	Load and go	11. <b>Altered Mental Status - Head Injury/ Child Abuse</b>
12.	Keep patient warm	12. Cover patient with blanket
13.	Reassess ABC's and mental/neuro status ( <b>always reassess after moving patient</b> )	13. Unresponsive to voice or painful stimuli, RR=28, nasal flaring, retractions, good chest rise, brachial pulses stronger, HR=120 bpm, skin

		pinking up, cool, dry, CRT=4 seconds, pupils equal & reactive, no spontaneous movement
14.	Detailed assessment – head to toe, examination – head, neck, chest, abdomen, lower extremities, upper extremities	14. No injury discovered to neck, chest, abdomen, pelvis, upper or lower extremities, bruising to face and head, deformity to R side of skull
15.	Check chemstrip	15. Chemstrip=80
16.	Reassess PRN, take SAMPLE history	16. LOC=unresponsive to voice/pain Pupils=equal & reactive Airway=open & clear Breathing=8, retractions Pulse=120 bpm, brachial Skin= pink, cool & dry CRT= 4 seconds S=unresponsive, bruising to face & head, deformity to R side of skull A=none M=none P=none L=bottle at 3pm E=mother gives unreliable history, states "He was lying on the floor and just started having trouble breathing"
17.	Continue to support respirations, and warm patient	17. Cover with a blanket, continue PPV with 100% oxygen

### **Knowledge Points:**

1. The priorities for treatment of altered mental status in a child are:

- Assess ABC's
  - Grade the level of consciousness
  - Assess for the cause of altered mental status
2. The airway of the unconscious child is vulnerable due to a depressed gag reflex. The child becomes unable to protect its airway, from aspiration of substances, into the lungs.
  3. The level of consciousness should be repeatedly graded by noting the child's eye, verbal and motor responses to verbal and painful stimuli.
  4. The AEIOU-TIPS acronym should be utilized to determine the condition that is causing the change in mental status.
    - ❖ A Alcohol Ingestion
    - ❖ E Encephalitis/Meningitis
    - ❖ I Insulin/Diabetes/Hypoglycemia
    - ❖ O Opiates/Poisons/Ingestions
    - ❖ U Uremia/Hypoxia/Hyperthermia/Hypothermia
    - ❖ T Trauma
    - ❖ I Infection/Sepsis
    - ❖ P Psychiatric/Emotional
    - ❖ S Seizures
  5. One in twenty children under the age of five will have at least one seizure in their lifetime resulting from a high fever. Seizures can also be caused by meningitis, poisoning, trauma or an inherited or acquired tendency for seizures (epilepsy). The important thing to remember is that in children, seizures can be very subtle. The typical tonic-clonic seizure or shaking all over will not always be present. Sometimes, all that is obvious is an altered mental status or the eyes will be deviated to one side. The first priority, as usual, is airway and breathing. Suction should also be ready, increased secretions are usually a problem during seizures. A high concentration of oxygen and positive pressure ventilations should be administered, if necessary. The patient should be placed in the recovery position to allow for drainage of secretions. This will also keep the tongue away from the back of the throat. Protect the patient from hurting themselves during a seizure, by removing objects they may strike, during a seizure. Never force anything into their mouth and never forcibly restrain a patient during a seizure.

### **Knowledge Points:**

1. Head injury in pediatric trauma situations should be suspected until proven otherwise.

2. Head trauma contributes to 80% of pediatric trauma mortality, with over 60% of pediatric major trauma victims having a significant head injury.
3. In the pediatric patient, the head makes up a larger proportion of the child's total body mass. The child also has relatively weaker neck and extremity muscles and is less able to protect the head from injuries.
4. Head injury, with Increased Intracranial Pressure (ICP), is the cause of most pediatric trauma mortality. ICP occurs when the brain swells, or blood starts to fill up the limited space within the skull, there is very limited accommodating space. The only place for it to go is through the opening in the base of the skull, where the spinal cord passes through, known as the foramen magnum. As the swelling or bleeding increases and pressure builds, the brain will actually be pushed through the foramen magnum. This condition, known as herniation, results in death.
5. A decrease in oxygen levels, and an increase level of carbon dioxide to the brain, will also contribute to ICP. With head injury, as the ICP increases the patient's level of consciousness decreases. As the level of consciousness decreases, the respiratory rate decreases, causing hypoxia in the brain. As hypoxia increases, ICP increases. It is imperative that an altering of mental status be assessed early, and oxygenation be given quickly, in an attempt to try and reverse the effects of ICP on the brain. The best way to accomplish this, is to hyperoxygenate the patient by delivering 100% oxygen by bag-valve-mask at a high ventilatory rate. For example, if the patient is an infant their breathing range is 30–40; you would hyperoxygenate at a rate of 40 to help reduce ICP. Frequently assess the patient's mental status, using the AVPU method, to discover changes in mental status early. Discovering altered mental status early, and hyperoxygenation, are the two best methods available to combat ICP in the head injury patient.
6. The early signs of Increased Intracranial Pressure are headache, nausea, vomiting, and altered mental status. As the condition worsens, the pupil on the injured side will begin to dilate. Decorticate (legs extended and arms flexed towards the body) and Decerebrate (extension of all four extremities) posturing may occur, this indicates impending brain herniation. This can be an ominous sign.

### **Knowledge Points:**

1. The rescuer must be alert to the first clues of child abuse:

- Suspicious injuries
  - Inconsistent histories
  - Neglect
  - Suspicious behaviors on the part of the parent or the child
2. Remaining professional, when faced with an obvious child abuse situation, is important for both the acute and long-term care of a child.
  3. Rescuers are required to report child abuse. Do not relinquish the responsibility to other caregivers. Follow through with any suspicions, with the physician that will be caring for the patient. If no one follows through with reporting make your suspicions known to the proper authorities
  4. Many abusive parents love their children. However, they may suffer from poor self-control, low self-esteem, and many frustrations in their lives, or an image of abusive behavior embedded deeply in their own childhood
  5. Accurate documentation is critical to those who will subsequently be defending the child's rights and interests.

**Medical Scenario - 6**  
(Near Drowning)

You are called to the scene of a community pool where bystanders are kneeling over a 4-year-old girl.

### Expected Responses:

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number Of Patients, Additional Resources, Scene Safety	1. Child supine on ground, not moving, bystanders state, "We found her at the bottom of the pool", 1 patient, scene is safe
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, assess respiratory effort, assess for audible breath sounds, LOC	2. Unresponsive to voice or pain, cyanotic, cool, no movement, airway obstructed, no respiratory effort, no audible breath sounds
3. Position – flat surface, open airway, air sniffing position, jaw thrust/chin lift, look, listen and feel, reassess respiratory effort, assess breath sounds, skin color, C-spine control	3. Airway open, RR=0, no respiratory effort after airway opened, breath sounds absent, skin cyanotic
4. Begin PPV with BVM and 100% oxygen and oral airway, rate 24, assess breath sounds, assess chest rise, <b>(Give first two breaths rapidly without oxygen)</b>	4. Patient has no gag reflex, good symmetrical chest rise, breath sounds equal & clear, skin cyanotic
5. Assess circulation: brachial/radial pulses, skin color/temp, and capillary refill <b>(START CPR)</b>	5. Carotid pulse only, HR=40 bpm, skin cyanotic, cool, CRT=5 seconds compression rate 100 (5:1), 1' - 1 1/2"
6. Assess for obvious signs of external hemorrhage	6. No obvious external hemorrhage
7. Note mental/neuro status (AVPU), assess pupils, muscle tone, response	7. Unresponsive to voice or pain, pupils dilated, extremely slow to respond,

	to painful stimuli		flaccid
8.	Reassess airway and respiratory efforts, breath sounds, skin color	8.	Airway open, RR=0, breath sounds equal & clear, skin pale, cool, good chest rise
9.	Reassess circulation: brachial/radial pulses, skin color/temp, CRT	9.	Carotid pulse only, HR=60 bpm, skin pale, cool, CRT=4 seconds
10.	Load and go	10.	<b>Respiratory Arrest/Drowning</b>
11.	Keep patient warm	11.	Cover patient with blanket
12.	Reassess ABC's and mental/neuro status ( <b>always reassess after moving patient</b> )	12.	Airway open, RR=0, breath sounds equal & clear, good chest rise, weak brachial pulse, HR=100, ( <b>STOP CPR</b> )
13.	Detailed assessment – head to toe, examination – head, neck, chest, abdomen, lower extremities, upper extremities	13.	No obvious conditions/injuries discovered
14.	Reassess PRN, take SAMPLE history	14.	LOC=unresponsive to voice/pain Pupils=equal & reactive Airway=open & clear Breathing=12, shallow Pulse=110, weak brachial Skin=pinking up, cool CRT=4 seconds S=unresponsive A=unknown M=unknown P=unknown L=unknown E=unknown
15.	Continue to support respirations, reassess and warm patient	15.	Continue PPV with 100% oxygen

**Knowledge Points:**

1. The large majority of pediatric cardiopulmonary arrests are unwitnessed respiratory arrests
2. Respiratory distress and arrest are the leading causes of cardiopulmonary arrest in children.
3. If respiratory distress is allowed to progress to respiratory arrest, hypoxia and acidosis often prevent the heart from being able to respond to interventions to get it beating again. It is vital that respiratory distress be recognized early and prevented from progressing. The recovery potential for the pediatric heart decreases with every minute poor oxygenation is allowed to continue.
4. High concentrations of oxygen and/or positive pressure ventilation must be administered to any child that is hypoventilating in order to prevent the patient from progressing to respiratory and cardiac arrest.
5. Chest rise is the most adequate measuring tool for proper ventilation.
6. Positive pressure ventilations are delivered with a slow inspiratory time and low pressures until chest rise is evident.
7. After every fifth compression, there should be a pause to allow for adequate chest rise with each ventilation.
8. If the heart rate drops below 60 bpm, in the infant, and below 40 bpm, in the older child, compressions should be started.

**Medical Scenario - 7**  
(Anaphylaxis)

You respond to the home of a 4-year-old boy having difficulty breathing. His mother greets you at the door.

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number Of Patients, Additional Resources, Scene Safety	1. Child sitting in a chair, obvious respiratory distress, <b>STRIDOR</b> , tripodding, Mother states, " He was out side playing. He came in a few minutes ago and I could tell he was having trouble breathing", 1 patient, scene safe, ETA of ALS unit 10 minutes
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, assess respiratory effort, assess for audible breath sounds LOC	2. Alert, eyes dull, fatigued, consolable, increased work of breathing, nasal flaring, retractions, <b>STRIDOR</b> , moving all extremities, rash on arms, legs, and chest
3. Position – allow child to choose, reassess respiratory effort, assess breath sounds, assess skin color, ask mother's help in examining child	3. Approach in a squatting position, ask mother to raise child's shirt, no cyanosis, no drooling, RR=40, moderate retractions, nasal flaring, <b>STRIDOR</b> , increased work of breathing
4. Administer 6 - 10 liters of oxygen via non re-breather mask	4. Patient accepts mask if mother puts it on
5. Assess breath sounds, skin color (warm stethoscope) solicit mother's mother's help, approach from behind	5. Bilateral <b>WHEEZING</b> , skin pale with rash, (instruct mother on how to place stethoscope on back)
6. Assess circulation: brachial/radial pulses, skin color/temp, and capillary refill	6. Brachial pulse=120 bpm, weak, skin pale, cool, CRT=3 seconds
7. Assess for obvious signs of external hemorrhage	7. No obvious external hemorrhage

- |     |   |     |  |
|-----|---|-----|--|
| 8.  | Note mental/neuro status (AVPU), assess pupils, muscle tone, response to painful stimuli                          | 8.  | Alert, eyes dull, fatigued, consolable, pupils equal & reactive, moves all extremities   |
| 9.  | Reassess airway and respiratory efforts, breath sounds, skin color  | 9.  | Airway partially obstructed, <b>STRIDOR</b> , increased work of breathing, nasal flaring, retractions, bilateral <b>WHEEZING</b> , skin pale, cool, rash on arms, legs, chest  |
| 10. | Reassess circulation: brachial/radial pulses, skin color/temp, CRT  | 10. | Weak brachial, HR=120 bpm, skin pale, cool, CRT=3 seconds  |
| 11. | Load and go   | 11. | <b>Respiratory Distress/Allergic Reaction</b>  |
| 12. | Keep patient warm   | 12. | Cover patient with blanket   |
| 13. | Reassess ABC's and mental/neuro status ( <b>always reassess after moving patient</b> )                            | 13. | Airway partial obstruction, <b>STRIDOR</b> , increased work of breathing, nasal flaring, moderate retractions, bilateral <b>WHEEZING</b> , brachial pulse weak, HR=130 bpm, skin pale, cool, CRT=3 seconds, responsive to voice, pupils equal and reactive |
| 14. | Detailed assessment – head to toe, examination – head, neck, chest, abdomen, lower extremities, upper extremities | 14. | Ant bites found on R leg, no other conditions discovered   |
| 15. | Reassess PRN, take SAMPLE history   | 15. | LOC= responsive to voice<br>Pupils=equal & reactive  |

Airway=partial obstruction, **STRIDOR**

Breathing=44, **WHEEZING**

Pulse=130 bpm, weak brachial

Skin=pale, cool

CRT= 3 seconds

S=**STRIDOR, WHEEZING, RASH**

A=none

M=none

P=none

L=breakfast

E=outside playing, trouble breathing

16. Continue to support respirations,  
and warm patient

16. Begin PPV if patient continues to  
deteriorate

**Knowledge Points:**

1. After respiratory distress, shock is the most frequent cause of cardiopulmonary arrest in the pediatric patient and is always considered a load-and-go situation.
2. The child's ability to constrict arteries and veins is much better than the adult, therefore, they compensate for blood loss much better than the adult does. A normal or near normal blood pressure, in the face of blood loss, is a very common occurrence in children. In a trauma situation, a normal blood pressure in a child, does not rule out shock in children.
3. Shock, in the pediatric patient, is most often due to volume loss or mal-distribution of circulatory volume.
4. Capillary refill time and peripheral pulses are the most reliable indicators for assessing circulation in a child.
5. Obtaining a reliable blood pressure in the pediatric patient can be very difficult. It is important to use the correct sized blood pressure cuff. The sounds to be heard when obtaining a blood pressure are difficult to hear in the pediatric patient. Normal blood pressures vary with the age of the child. The caregiver must be familiar with the normal ranges of all age groups of pediatric patients in order to properly interpret the blood pressure readings. If a proper sized cuff is available, a blood pressure should be taken as a baseline and then repeated periodically to measure for a trend.
6. In the presence of a head injury, shock will be the leading cause of death. If the patient has a head injury and severe bleeding, it is important to treat the shock first.
7. Distributive shock can be caused by two primary reasons in the pediatric patient.
  - Hypovolemia - circulation volume loss due to bleeding or dehydration
  - Mal-Distributive - circulating volume is pooled in a larger vascular space because of vasodilation caused by a toxic substance - infection (sepsis) or a allergen (anaphylaxis)
8. Anaphylaxis occurs when the child is exposed to an allergen. They will appear very ill, have a sudden onset of wheezing, and have a blotchy rash that itches (hives/urticaria). The allergen eventually causes massive vasodilation resulting in shock.
9. Sepsis is a severe infection that reaches the blood stream, and results in massive vasodilation and shock. The child will be cool instead of hot, and will have a fine rash called petechiae or purpura. The child usually has a history of being ill for several days.
10. Dehydration can lead to shock because the patient loses large amounts of fluid by sweating or massive vomiting and/or diarrhea. The child is usually too ill to take in enough fluids to counteract the loss of fluid.

### **Medical Scenario - 8**

(Asthma)

You respond to a 5-year-old child complaining of difficulty breathing. Mother is on the scene.

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number Of Patients, Additional Resources, Scene Safety	1. Child sitting in chair, tripodding, obvious respiratory distress, <b>WHEEZING</b> , mother hands partner child's medicine, ask "how can she help"?, 1 patient, scene is safe, transport units all busy, 20 minute wait
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, assess respiratory effort, assess for audible breath sounds, LOC	2. Extremely fatigued, eyes dull, consolable, moving all extremities, airway open, increased work of breathing, <b>WHEEZING</b> , retractions, nasal flaring
3. Position – allow child to choose, reassess respiratory effort, assess breath sounds, assess skin color	3. Child sits up in chair, increased work of breathing, retractions, nasal flaring, bilateral <b>WHEEZING</b> , RR=46
4. Administer 100% oxygen via non re-breather mask, assess respiratory effort, breath sounds, skin color	4. Child accepts mask, increased work breathing, retractions, nasal flaring, bilateral <b>WHEEZING</b> , skin pale
5. Assess circulation: brachial/radial pulses, skin color/temp, and capillary refill	5. Brachial pulse=130 bpm, strong, skin pink, warm, dry, CRT=3 seconds
6. Assess for obvious signs of external hemorrhage	6. No obvious external hemorrhage
7. Note mental/neuro status (AVPU),	7. Alert, fatigued, consolable, pupils

	assess pupils, muscle tone, response to painful stimuli		equal and reactive, good muscle tone, moves all extremities
8.	Reassess airway and respiratory efforts, breath sounds, skin color	8.	Airway open, increased work of breathing, RR=42, retractions, nasal flaring, bilateral <b>WHEEZING</b> , skin pale, warm
9.	Reassess circulation: brachial/radial pulses, skin color/temp, CRT	9.	Brachial pulse=130 bpm, strong, skin pale, warm, CRT=3 seconds
10.	Load and go	10.	<b>Respiratory Distress/Asthma</b>
11.	Keep patient warm	11.	Cover patient with blanket
12.	Reassess ABC's and mental/neuro status ( <b>always reassess after moving patient</b> )	12.	Alert, fatigued, eyes dull, consolable, moves all extremities, airway open, increased work of breathing, nasal flaring, retractions, RR=42, HR=130 bpm, brachial pulse, strong, skin pale, warm, CRT=3 seconds
13.	Detailed assessment – head to toe, examination – head, neck, chest, abdomen, lower extremities, upper extremities	13.	No other obvious conditions discovered
14.	Reassess PRN, take SAMPLE history	14.	LOC=Alert, fatigued, eyes dull,

consolable  
Pupils=equal & reactive  
Airway=open & clear  
Breathing=42, labored, retractions  
Pulse=130, brachial strong  
Skin= pale, warm  
CRT= 2 seconds  
S=difficulty breathing, retractions  
A=none  
M=Albuterol  
P=Asthma  
L=lunch  
E=gradual increase in dyspnea during the day

15. Continue to support respirations, and warm patient

15. 100% oxygen via non rebreather mask

**Knowledge Points:**

1. 65 % of all cardiopulmonary arrests in the pediatric age group are related to respiratory causes.
2. Four of the eight most common non-traumatic pediatric conditions resulting in admission to a hospital involves the respiratory system.
3. Often treatment must begin before the cause of the emergency can be diagnosed. In the pediatric patient, a delay in oxygenation, could be the difference in the child surviving or not surviving.
4. The single most important intervention that can be performed for the pediatric patient is to open the airway.
5. Because of the small nature of the child's airway, the airway should be placed in the sniffing or neutral position. This prevents a collapse of the airway.
6. There are four primary respiratory emergencies encountered with the pediatric patient:
  - ♦ Foreign Body Airway Obstruction - Children will put anything in their mouths. If a FBAO is suspected and the child is still able to pass air, do not intervene. Even if respirations sound noisy, trying to remove the obstruction might force it further down in the airway. This could turn a partial obstruction into a complete obstruction
  - ♦ Croup - A viral infection of the trachea. It usually affects older infants and toddlers less than 3 years old. It does occur in older children sometimes. The child with croup usually has a gradual onset of dyspnea, has a low grade fever, does not appear sick, has a "seal barky" cough and stridor. The patient will benefit from cool air. Agitation of the patient should be avoided as it could make the obstruction worse.
  - ♦ Epiglottitis - Is a more serious cause of airway obstruction. It has a potential for rapid progression to complete obstruction. It is a bacterial infection of the epiglottitis. It is usually seen in children older than two years old. The child usually has a high-grade fever, and appears very ill. The child will choose to lean forward on their arms, "tripoding", and will drool because their throat is so painful it hurts to swallow. They will have stridor. The potential for the child to experience a sudden complete airway obstruction is high. It is extremely important to keep the patient calm and do nothing that might stimulate the airway.
  - ♦ Asthma - Obstruction of the smaller airways deep in the lungs. Usually causes bronchospasms that result in wheezing. It is most often caused by an allergy. It can usually be differentiated from FBAO because asthma is usually a gradual process.
7. Regardless of the cause, children in respiratory distress should be managed the same way:
  - Offer oxygen if tolerated
  - Keep the child calm
  - Position to optimize breathing
  - Begin positive pressure ventilations for apnea, gasping or cyanosis that develops in spite of being given oxygen

## **Medical Scenario - 9**

(Respiratory Arrest)

While you are on the scene with a six-month-old child that has a fever, cough and increased respiratory rate, the child suddenly becomes mottled, blue, apneic and has a heart rate of 70. Mother is on the scene.

### **Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number Of Patients, Additional Resources, Scene Safety	1. Sudden onset of apnea and bradycardia, 1 patient, ETA on ALS unit is 10 minutes, scene is safe
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, assess respiratory effort, assess for audible breath sounds, LOC	2. Unresponsive to voice or pain, cyanotic, not moving, airway open, no respiratory effort, no audible breath sounds
3. Position – flat surface, open airway, air sniffing position, jaw thrust/chin lift, look, listen and feel, reassess respiratory effort, assess breath sounds, assess skin color	3. No spontaneous respirations, no chest rise, absent breath sounds, cyanotic
4. Begin PPV with BVM and 100% oxygen and oral airway, rate 40 bpm, assess breath sounds, assess chest rise, <b>(Give first two breaths rapidly without oxygen)</b>	4. Patient has no gag reflex, good chest rise, breath sounds equal and clear
5. Assess circulation: brachial/radial pulse, skin color/temp, and capillary refill, <b>(Begin CPR, rate 100 (5:1) depth 1/2" - 1")</b>	5. Carotid pulse only, HR=50 bpm, skin cyanotic, mottled, cool, diaphoretic, CRT=5 seconds
6. Assess for obvious signs of external hemorrhage	6. No obvious external hemorrhage

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| 7.  | Note mental/neuro status (AVPU), assess pupils, muscle tone, response to painful stimuli, fontanel                | 7.  | Unresponsive to voice/pain, pupils dilated, slow to respond, flaccid, fontanel soft  |
| 8.  | Reassess airway and respiratory efforts, breath sounds, skin color  | 8.  | Airway open & clear, RR=0<br>no spontaneous respirations, breath sounds absent, cyanotic                                     |
| 9.  | Reassess circulation: brachial/radial pulses, skin color/temp, CRT  | 9.  | Brachial pulse only, HR=52 bpm, skin cyanotic, cool, diaphoretic, CRT=5 seconds  |
| 10. | Load and go   | 10. | <b>Respiratory Arrest</b>  |
| 11. | Keep patient warm   | 11. | Cover patient with blanket   |
| 12. | Reassess ABC's and mental/neuro status ( <b>always reassess after moving patient</b> )                            | 12. | Airway open, RR=0, breath sounds equal & clear, good chest rise, carotid pulse only, HR=74 bpm, ( <b>stop compressions</b> ) |
| 13. | Detailed assessment – head to toe, examination – head, neck, chest, abdomen, lower extremities, upper extremities | 13. | No other obvious conditions discovered   |
| 14. | Reassess PRN, take SAMPLE history   | 14. | LOC=unresponsive to voice/pain<br>Pupils=equal & reactive  |

Airway=open & clear  
Breathing=0  
Pulse=100 bpm, weak brachial  
Skin= cyanotic  
CRT=4 seconds  
S=RR=0, no spontaneous chest rise  
A=none  
M=Tylenol  
P=chest cold  
L=bottle 1 hour ago  
E=sick with a cold and chest congestion

15. Continue to support respirations,  
and warm patient

15. Continue PPV with 100%

**Knowledge Points:**

- 1. The large majority of pediatric cardiopulmonary arrests are unwitnessed respiratory arrests**
- 2. Respiratory distress and arrest are the leading causes of cardiopulmonary arrest in children.**
- 3. If respiratory distress is allowed to progress to respiratory arrest, hypoxia and acidosis often prevent the heart from being able to respond to interventions to get it beating again. It is vital that respiratory distress be recognized early and prevented from progressing. The recovery potential for the pediatric heart decreases with every minute poor oxygenation is allowed to continue.**
- 4. High concentrations of oxygen and/or positive pressure ventilation must be administered to any child that is hypoventilating in order to prevent the patient from progressing to respiratory and cardiac arrest.**
- 5. Chest rise is the most adequate measuring tool for proper ventilation.**
- 6. Positive pressure ventilations are delivered with a slow inspiratory time and low pressures until chest rise is evident.**
- 7. If the heart rate drops below 60 bpm, in the infant, and below 40 bpm, in the older child, compressions should be started.**
- 8. After every fifth compression, there should be a pause to allow for adequate chest rise with each ventilation.**

**Medical Scenario – 10**  
**(Hypovolemia/Dehydration)**

You are called to the scene of an 8-month-old female with a two-day history of vomiting and diarrhea. Mother is on the scene.

### **Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number Of Patients, Additional Resources, Scene Safety	1. Positive home environment, mother holding baby, baby alert, eyes dull, sunken, no increased work of breathing, 1 patient, scene is safe, ETA on transport unit is 10 minutes
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, assess respiratory effort, assess for audible breath sounds, LOC	2. Child listless, moving all extremities, alert, eyes dull, easily distracted/ consoled by mother, airway open, normal respiratory effort, no audible breath sounds
3. Position – allow mother to hold child, reassess respiratory effort, assess breath sounds, assess skin color <b>(utilize mother's help, ask her to lift child's shirt)</b>	3. With child in mothers arms/lap, approach in a squatting position, assess respiratory effort after mother lifts shirt, no cyanosis, no drooling, RR=40, no retractions or nasal flaring, good chest rise
4. Administer 6 - 10 liters of oxygen by various means until child accepts <b>(DO NOT FORCE)</b>	4. Child will allow mother to hold paper cup with oxygen tubing to its face, good chest rise
5. Assess circulation: brachial/radial pulses, skin color/temp, and capillary refill	5. Weak brachial pulses, HR=150 bpm, skin pale, cool, diaphoretic, CRT=4 seconds
6. Assess for obvious signs of external hemorrhage	6. No obvious external hemorrhage
7. Note mental/neuro status (AVPU), assess pupils, muscle tone, response	7. Alert, listless, eyes dull, sunken, pupils differed so as not to upset

	to painful stimuli, assess fontanel		infant, weak muscle tone, fontanel sunken
8.	Reassess airway and respiratory efforts, breath sounds, skin color	8.	Airway open, normal respiratory efforts, without retractions or nasal flaring, breath sounds equal & clear, good chest rise
9.	Reassess circulation: brachial/radial pulses, skin color/temp, CRT	9.	Weak brachial pulses, HR=150 bpm, skin pale, cool, diaphoretic, CRT=4 seconds
10.	Load and go	10.	<b>Hypovolemia/Dehydration</b>
11.	Keep patient warm	11.	Cover patient with blanket
12.	Reassess ABC's and mental/neuro status ( <b>always reassess after moving patient</b> )	12.	Airway open & clear, RR=40, normal respiratory effort, without retractions or nasal flaring, good chest rise, brachial pulses stronger, skin pale, cool, dry, CRT=3 seconds, alert, eyes dull, sunken, easily consoled/distracted by mother, fontanel sunken
13.	Detailed assessment – head to toe, examination – head, neck, chest, abdomen, lower extremities, upper extremities	13.	No other obvious condition discovered
14.	Reassess PRN, take SAMPLE history	14.	LOC=alert, eyes dull, consolable Pupils=differed

Airway=open & clear  
Breathing=40, good chest rise  
Pulse=150 bpm, strong brachial  
Skin=pale, cool, dry  
CRT=3 seconds  
S=listless, eyes sunken, fontanel  
sunken  
A=none  
M=Tylenol  
P=none  
L=bottle 1 hour ago  
E=vomiting and diarrhea for 2 days

15. Continue to support respirations,  
child & mother and warm patient

15. Paper cup oxygen at 6 liters

**Knowledge Points:**

1. After respiratory distress, shock is the most frequent cause of cardiopulmonary arrest in the pediatric patient and is always considered a load-and-go situation.
2. The child's ability to constrict arteries and veins is much better than the adult, therefore they compensate for blood loss much better than the adult does. A normal or near normal blood pressure in the face of blood loss is a very common occurrence in children. In a trauma situation, a normal blood pressure in a child, does not rule out shock in children.
3. Shock in the pediatric patient is most often due to volume loss or mal-distribution of circulatory volume.
4. Capillary refill time and peripheral pulses are the most reliable indicators for assessing circulation in a child.
5. Obtaining a reliable blood pressure in the pediatric patient can be very difficult. It is important to use the correct sized blood pressure cuff. The sounds heard when obtaining a blood pressure are difficult to hear in the pediatric patient. Normal blood pressures vary with the age of the child. The caregiver must be familiar with the normal ranges of all age groups of pediatric patients in order to properly interpret the blood pressure readings. If a proper sized cuff is available, a blood pressure should be taken as a baseline and then repeated periodically to measure for a trend.
6. In the presence of a head injury, shock will be the leading cause of death. If the patient has a head injury and severe bleeding, it is important to treat the shock first.
7. Distributive shock can be caused by two primary reasons in the pediatric patient.
  - Hypovolemia - circulation volume loss due to bleeding or dehydration
  - Mal-Distributive - circulating volume is pooled in a larger vascular space because of vasodilation caused by a toxic substance - infection (sepsis) or an allergen (anaphylaxis)
1. Anaphylaxis occurs when the child is exposed to an allergen. They will appear very ill, have a sudden onset of wheezing, and has a blotchy rash that itches (hives/urticaria). The allergen eventually causes massive vasodilation resulting in shock.
9. Sepsis is a severe infection that reaches the blood stream and results in massive vasodilation and shock. The child will be cool instead of hot and will have a fine rash called petechiae or purpura. The child usually has a history of being ill for several days.
10. Dehydration can lead to shock because the patient loses large amounts of fluid by sweating, or massive vomiting and/or diarrhea. The child is usually too ill to take in enough fluids to counteract the loss of fluid.

### **Medical Scenario – 11**

(Hypovolemia/Septic Shock)

You respond to a 2- year -old child that has been irritable and not acting right for several days. Mother is on the scene.

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Type of Medical Emergency, Number of Patients, Additional Resources, Scene Safety	1. Child in mothers arms, very ill in appearance, listless, Mother states, "I think he's had a fever, he won't eat and he's been sweaty", 1 patient, scene is safe, ALS unit 15 minutes out
2. Assess general appearance from a distance, assess spontaneous movement, establish (un)responsiveness, assess airway, assess respiratory effort, assess for audible breath sounds, LOC	2. Spontaneous movements, airway open, moderate retractions, nasal flaring, no audible breath sounds, alert, eyes dull, focuses on objects, easily consoled by mother
3. Position – allow mother to hold child, reassess respiratory effort, assess breath sounds, assess skin color <b>(utilize mother's help, ask her to hold up child's shirt)</b>	3. Approach in a squatting position, increased work of spontaneous breathing, retractions, nasal flaring, RR=36, skin pale, covered with petechiae/purpura (rash), cyanotic around mouth, breath sounds equal & clear, child doesn't resist exam
4. Administer 100% oxygen via non re-breather mask, 6 - 10 liters per minute	4. Child accepts mask from mother, good chest rise
5. Assess circulation: brachial/radial pulses, skin color/temp, and capillary refill	5. Weak brachial pulses, HR=250 bpm, skin pale, cyanotic around mouth, cool, diaphoretic, rash, CRT=4 seconds
6. Assess for obvious signs of external	6. No obvious external hemorrhage

hemorrhage

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| 7.  | Note mental/neuro status (AVPU), assess pupils, muscle tone, response to painful stimuli                          | 7.  | Alert, listless, eyes dull, focuses on objects, easily consoled/distracted by mother, pupils differed as to not upset child, muscle tone weak   |
| 8.  | Reassess airway and respiratory efforts, breath sounds, skin color  | 8.  | Airway open, increased work of breathing, moderate retractions, nasal flaring, RR=36, cyanosis gone, skin pale with rash, cool, diaphoretic,  |
| 9.  | Reassess circulation: brachial/radial pulses, skin color/temp, CRT  | 9.  | Brachial pulses strong, HR=200 bpm, skin pale with rash, cool, diaphoretic, CRT=3 seconds   |
| 10. | Load and go   | 10. | <b>Hypovolemia/Septic Shock</b>   |
| 11. | Keep patient warm   | 11. | Cover patient with blanket  |
| 12. | Reassess ABC's and mental/neuro status (always reassess after moving patient)                                     | 12. | Airway open, increased work of breathing, retractions, nasal flaring, RR=36, good chest rise, clear & equal breath sounds, HR=180 bpm, strong brachial pulses, skin, pale with a rash, cool, diaphoretic, CRT=3 seconds |
| 13. | Detailed assessment – head to toe, examination – Head, neck, chest, abdomen, lower extremities, upper extremities | 13. | No other obvious conditions discovered  |
| 14. | Reassess PRN, take SAMPLE history   | 14. | Alert, listless, eyes dull, consolable  |

Pupils=differed  
Airway=open & clear  
Breathing=36, retractions  
Pulse=180 bpm, strong brachial  
Skin=pale, cool, diaphoretic, rash  
CRT=3 seconds  
S=rash, RR=36, lethargy, HR=180  
A=none  
M=none  
P=none  
L=lunch  
E=not eating, not acting right

15. Continue to support respirations,  
and warm patient

15. 100 % oxygen via non re-breather mask  
6 - 10 liters per minute

**Knowledge Points:**

1. After respiratory distress, shock is the most frequent cause of cardiopulmonary arrest in the pediatric patient, and is always considered a load-and-go situation.
2. The child's ability to constrict arteries and veins is much better than the adult, therefore they compensate for blood loss much better than the adult does. A normal or near normal blood pressure in the face of blood loss is a very common occurrence in children. In a trauma situation, a normal blood pressure in a child, does not rule out shock in children.
3. Shock in the pediatric patient is most often due to volume loss or mal-distribution of circulatory volume.
4. Capillary refill time and peripheral pulses are the most reliable indicators for assessing circulation in a child.
5. Obtaining a reliable blood pressure in the pediatric patient can be very difficult. It is important to use the correct sized blood pressure cuff. The sounds heard when obtaining a blood pressure are difficult to hear in the pediatric patient. Normal blood pressures vary with the age of the child. The caregiver must be familiar with the normal ranges of all age groups of pediatric patients in order to properly interpret the blood pressure readings. If a proper sized cuff is available, a blood pressure should be taken as a baseline and then repeated periodically to measure for a trend.
6. In the presence of a head injury, shock will be the leading cause of death. If the patient has a head injury and severe bleeding, it is important to treat the shock first.
7. Distributive shock can be caused by two primary reasons in the pediatric patient.
  - Hypovolemia - circulation volume loss due to bleeding or dehydration
  - Mal-Distributive - circulating volume is pooled in a larger vascular space because of vasodilation caused by a toxic substance - infection (sepsis) or a allergen (anaphylaxis)
8. Anaphylaxis occurs when the child is exposed to an allergen. They will appear very ill, have a sudden onset of wheezing, and have a blotchy rash that itches (hives/urticaria). The allergen eventually causes massive vasodilation, resulting in shock.
9. Sepsis is a severe infection that reaches the blood stream and it results in massive vasodilation and shock. The child will be cool instead of hot and will have a fine rash called petechiae or purpura. The child usually has a history of being ill for several days.
10. Dehydration can lead to shock because the patient loses large amounts of fluid by sweating, or massive vomiting and/or diarrhea. The child is usually too ill to take in enough fluids to counteract the loss of fluid.

# **TRAUMA SKILLS STATIONS**

## **Objectives:**

1. To teach the systematic approach to the pediatric trauma victim.
2. To teach those aspects of pediatric trauma management which differ from adult trauma management.

## **Time:**

45 minutes

## **Students:**

6 students/station

## **Instructors:**

1 instructor

## **Facility:**

A small room with a chair and stretcher.

## **Equipment:**

- \*1 resusci-baby
- \*1 life-size doll the size of a toddler
- \*1 backboard (or prop simulating a backboard) 3 or 4 straps, head immobilizer
- \*1 jump kit with basic equipment including BVM with mask, oxygen mask, nasal cannula, oral/nasal airways, stethoscope, tape, dressings and bandage, ace wraps, Yankauer suction catheter, gloves, splints, triangle bandage, penlight, pediatric blood pressure cuff
- \*1 oxygen tank
- \*3 sheets or blankets

## **Organization**

Multiple scenarios are presented. For each, two students are chosen to manage the scenario. If necessary, another student is chosen to play the part of a parent after brief prompting. **After the scenario is played out the student's observing the case should be asked to critique the management. The instructor then leads a discussion emphasizing key teaching points listed at the end of the Trauma chapter.** If additional time remains after the three scenarios have been presented, an additional scenario can be used which parallels one of the three scenarios provided except for a change in the circumstances resulting in the injuries so that the scenario is not recognized as a repeat. **The instructor should be familiar enough with the progression of the scenario so that requested information flows freely to the student. The instructor should also know the undesirable actions and their rationale. In teaching, students who attempt undesirable actions should be gently corrected with rationale thoroughly explained.**

## **TRAUMA SCENARIO - 1**

You are called to a house where an 18 month old toddler has fallen out of a second story window.

### **Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Mechanism of Injury, Number of Patients, Additional Resources, Scene Safety	1. Positive environment, baby in mother's arms crying, fall from 3 <sup>rd</sup> story window, 1 patient, scene is safe, delay of 20 minutes on transport unit
2. Assesses general appearance from a distance, assess spontaneous movements, assess airway, assess audible breath sounds, assess respiratory efforts (asks mother to lift shirt), LOC (AVPU), <b>Instruct mother to control C-spine</b>	2. Moving neck well, no audible breath sounds, RR=32, no retracting, symmetric movements, awake, aware of surroundings, moves all extremities well, is easily consoled/distracted, mother supports patients head and neck against her chest, Mother states, " He passed out for just a few minutes."
3. Approaches infant squatting, auscultates breath sounds, (back only), offers oxygen 6 – 10 L via non-rebreather mask	3. Breath sounds clear and equal, infant refuses oxygen
4. Assesses circulation: color/temp of extremities radial/brachial pulse, capillary refill	4. Extremities cool/pink but infant exposed, radial pulse, HR=120 bpm, strong & CRT 2 seconds
5. Assess for obvious external hemorrhage	5. Minimal bleeding from scalp wound

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| 6. Instructs mother to apply direct pressure with 4 x 4 to scalp wound  | 6. Child accepts direct pressure from mother but not rescuer   |
| 7. Notes mental/neuro status (AVPU), assess fontanel, response to pain  | 7. Alert child, easily consoled, fontanel closed, withdraws from pain  |
| 8. Notes pupils and tone (do not check pupillary reaction with a light)   | 8. Pupils equal and tone good  |
| 9. Detailed exam: ask mother to assist by lifting shirt, etc., toe to head examination – head, neck, chest, abdomen, pelvis, lower extremities, upper extremities | 9. Abrasion LUQ, cries when left arm is moved, tenderness to palpation   |
| 10. Assess pulse in left arm  | 10. Easily palpable  |
| 11. Splints L arm or asks parent to support arm   | 11. Mother cradles/supports arm to patient's body  |
| 12. Rechecks pulse (if splinted)  | 12. Strong pulse   |
| 13. Load and go   | 13. LOC=alert, aware<br>Pupils=normal/reactive<br>Airway=open, clear<br>Breathing=26, no distress<br>Pulse=120 bpm, strong radial<br>Skin=pink, warm, dry<br>CRT=2 seconds<br>Place mother on stretcher with child in her lap, mother continues to hold C-spine and stabilization of fractured arm enroute |
| 14. Keep patient warm, reassess PRN   | 14. Wrap patient in a blanket  |

### **Knowledge Points:**

1. **Assessment of the neurological status of a pediatric patient, is usually limited to assessment of mental status, pupils. and muscle tone. In addition, the fontanel is assessed, on the infant.**
2. **Mental status is minimally graded using the mnemonic AVPU. A - Alert, V - Responds to voice, P - Responsive to painful stimuli, and U - Unresponsive.**
3. **General appearance: Single most important parameter utilized when assessing the ill or injured child. It is best assessed from a distance. There are several important components of the general appearance assessment:**
  - ❖ **Alertness – How responsive is the patient to their environment?**
  - ❖ **Distractibility – How readily does an object, sound, or person draw away the patient’s attention?**
  - ❖ **Consolability – How easily can the distressed child be comforted?**
  - ❖ **Speech/Cry – Is their speech/cry strong and spontaneous, or weak and muffled? Is it absent unless stimulated, or absent all together?**
  - ❖ **Spontaneous activity – Does the child appear flaccid? Do the extremities move only in response to stimuli? Is there spontaneous movement?**
  - ❖ **Color - Is there pallor, a flushed appearance, cyanosis, or mottling? Is the skin color of the trunk different than the extremities?**
  - ❖ **Respiratory Efforts – Are there intercostal, supraclavicular or suprasternal retractions in the resting state? Is nasal flaring present?**
  - ❖ **Eye Contact – Does the patient maintain eye contact with the people around them, or do they gaze aimlessly around? Do the eyes look dull and unfocused, or do the eyes stay focused on specific objects?**
4. **The Glasgow Coma Scale is utilized to determine a patients mental and neurological status. In the pediatric patient, a modified form of the GCS is utilized. It rates the patients overall response to verbal and painful stimuli. It measures eye opening, best motor response and best verbal score to these stimuli. In the pediatric patient, there are two grading levels – under one year old and over one year old. A numerical score is given to each response, in each category, and a total score is obtained. This score is then utilized to estimate the patients overall mental and neurological status.**

## **TRAUMA SCENARIO - 2**

You have been called to the home of a four-month-old whose mother states that he fell.

### **Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene size up, PPE/BSI, Determine Mechanism of Injury, Number of Patients, Additional Resources, Scene Safety	1. Story doesn't fit injury, child in mother's lap, possible blunt force trauma (suspect child abuse), 1 patient, ETA on ALS unit 10 minutes, scene safe
2. Assess general appearance from a distance, assess spontaneous movement, assess airway, assess audible breath sounds assess respiratory efforts, LOC/AVPU	2. No spontaneous movement no audible breath sounds, blood in nose and mouth, gasping respirations, cyanotic, unresponsive to pain, Mother states, " He pulled himself up in his crib and he fell"
3. Manually immobilize C-spine, place on long back board with padding under shoulders	3. Maintain manual stabilization until head taped/strapped to LBB
4. Place head in the sniffing position, jaw-thrust/chin lift, suction airway, look, listen and feel, reassess respiratory effort, assess breath sounds, assess chest symmetry, skin color	4. Gasping respirations without gurgling, RR=6, shallow breath sounds, clear & equal symmetrical chest rise, cyanosis
5. Begin PPV with BVM and 100% O2 rate 30 – 40, hyperoxygenation, auscultate breath sounds	5. Patient has no gag reflex, good chest rise, equal & clear breath sounds
6. Assess circulation: brachial/radial, pulses, skin color/temp and CRT	6. Brachial pulse=160 and strong, radial pulse is weak,

7.	Assess for obvious external hemorrhage	7.	capillary refill = 3 seconds None obvious except small scalp laceration.
8.	Apply direct pressure with 4 x 4 to scalp wound	8.	Direct pressure to scalp wound controls bleeding
9.	Note mental/neuro status (AVPU), assess pupils, assess fontanel, muscle tone	9.	Unresponsive to pain, pupils dilated, slow to respond, fontanel firm, muscle tone flaccid
10.	Continue 30-40 ventilatory rate to decrease ICP	10.	Color continues to improve
11.	Load and Go	11.	<b>Possible Head Injury/ Child Abuse</b>
12.	Spinal Immobilization with 3 or 4 straps, head immobilizer and tape, place pad under shoulders (include a cervical collar if appropriate size is available)	12.	Strap torso and legs to LBB before taping/strapping head to the board, if correct c-collar is not available use towel roll and tape
13.	Reassess ABC's and mental/neuro (AVPU) status ( always reassess after moving patient)	13.	Airway open, breathing assisted 30 – 40 via BVM brachial pulse=160, skin pale/cool, CRT=3 - 4 seconds, unresponsive to pain, pupils dilated and slow to respond
14.	Detailed assessment: head to toe examination – head, neck, chest, abdomen, pelvis, lower extremities upper extremities	14.	Head: hematoma L side, blood in L ear, no injury to chest, abdomen distended no injuries to extremities
15.	Keep patient warm	15.	Cover patient with blanket

16. Reassess PRN

16. LOC=unresponsive to pain  
Pupils=dilated, slow to respond  
Airway=open, clear  
Breathing=6, shallow  
Pulse=160 bpm, brachial only  
Skin=pale, cool  
CRT=3 – 4 seconds  
Bleeding=controlled

17. Continue to hyperoxygenate patient

17. BVM with 100% oxygen,  
30 – 40

### **Knowledge Points:**

1. **Trauma kills more children, and accounts for more pediatric EMS calls, than all other causes combined.**
2. **The general approach to the assessment and management of the pediatric trauma patient is the same as for the adult:**
  - ❖ **Cervical spine immobilization**
  - ❖ **Airway assessment and management**
  - ❖ **Breathing assessment and management**
  - ❖ **Circulatory assessment and management**
  - ❖ **Disability - neurological assessment and management**
  - ❖ **Rapid head to toe examination**
3. **Cervical spine fractures are uncommon in children. The cervical spine of the pediatric patient is best immobilized with towel rolls and tape, or foam blocks and velcro straps. This is due to the fact that a properly fitting cervical collar will not always be available.**
4. **The cervical spine of the awake, frightened toddler should be immobilized with great care, to avoid further damage, resulting from the child's resistance to the procedure. Never forcibly immobilize a struggling child. It is better to utilize the parent when immobilizing the frightened child.**
5. **Opening the airway, is the single most important maneuver, the rescuer will perform on most multiple trauma patients. The pediatric airway is much smaller than the adult airway. It is much easier to occlude. In the infant, the "sniffing position", is the best technique for opening the airway. In the older child, maintaining the airway in the neutral position with a jaw thrust/chin lift, is the best technique for opening the airway. Placing a pad under the shoulders, in the smaller child, will help maintain the airway position, and will also help maintain the cervical spine in the correct position, when the patient is placed on a spine board.**
6. **Circulation is best assessed using capillary refill, peripheral pulses and temperature and color of the skin. Blood pressures are often unreliable indicators of the true circulatory status of the pediatric patient.**
7. **How you approach the frightened child is very important. Standing over a small child will just increase their fears. Approach the alert child in a stooping/squatting position. Getting down to their level will do a lot to lessen their fears of a stranger.**
8. **Utilizing the parents when giving care to the small child will go a long way in successfully caring for the frightened child. Have Mom hold oxygen to the patients face, let them hold direct pressure on a wound, have Dad stabilize C-spine or a**

**fractured arm.**

- 9. If a life threatening injury or condition is found during the ABC assessment, load-and-go is in order after stabilizing life- threatening conditions. The detailed assessment is deferred until later.**
- 10. When caring for a fractured extremity, assessing for a pulse is very important. If the pulse is absent in a fractured extremity, gentle realignment of the fracture to return the pulse, is important. If the pulse does not return, splint the fracture and rapidly transport.**
- 11. Keeping a child calm will help reduce their anxiety. This will make caring for them easier, and will prevent increasing their respiratory rate, and the risk of hypoxia.**
- 12. Because of their large occiputs, small children's heads tend to flex forward, when they are lying flat on a hard surface. For this reason, when children are immobilized on a long spine board, a small towel or sheet should be placed under their shoulders. This helps to bring their cervical spines in line. It also helps to keep their heads in a neutral position. This helps to keep their airways open.**

### **TRAUMA SCENARIO - 3**

You are called to the scene of an accident where a 6-year-old boy has been hit by a car.

#### **Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene size up, PPE/BSI, Determine Mechanism of Injury, Number of Patients, Additional Resources, Scene Safety	1. Patient lying prone in the street, struck by car - blunt force trauma, child pale, no response to voice, 1 patient, scene is safe, ETA for ALS unit is 10 minutes
2. Assess general appearance from a distance, assess spontaneous movement, assess airway, assess audible breath sounds, assess respiratory effort, LOC (AVPU)	2. No spontaneous movement airway open, no audible breath sounds, RR=28, shallow, no response to voice. responds to pain
3. Log roll (while manually immobilizing C-spine) onto long backboard with padding under shoulders	3. Maintain manual stabilization until head is taped/strapped to LBB, patient briefly opens eyes
4. Place head in sniffing position, jaw thrust/chin lift, assess airway, look, listen and feel, assess respiratory effort, maintain C-spine auscultate breath sound, assess skin color, symmetry of chest	4. Slightly shallow respirations, RR=28, no unusual breath sounds, airway open, no increased work of breathing, skin pale, symmetrical chest rise
5. Administer mask O2 6 -10 liters with non re-breather mask	5. Patient tolerates mask, acceptable symmetrical chest rise, breath sounds clear, skin still pale

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| 6.  | Assess circulation: skin color/temp, radial/brachial pulses and capillary refill   | 6.  | Brachial pulse = 120 bpm, weak, radial pulse not palpable, extremities cool/pale, CRT=5 seconds                                       |
| 7.  | Check for obvious external hemorrhage  | 7.  | No obvious external hemorrhage  |
| 8.  | Note mental status (AVPU), assess pupils, muscle tone grip strength, response to painful stimulus  | 8.  | No response to voice, groans to pain, slight improvement, unable to follow commands, flaccid muscle tone, pupils equal and reactive   |
| 9.  | Reassess airway & respiratory efforts, breath sounds, skin color   | 9.  | No change in respiratory effort, slightly shallow, RR=28, breath sounds clear & equal, skin pale, airway open & clear                 |
| 10. | Consider assisting ventilation with BVM and oral airway  | 10. | No gag reflex, color shows progressive improvement after assisting ventilations   |
| 11. | Reassess circulation: skin color/temp brachial/radial pulses, CRT  | 11. | Minimal improvement, brachial pulses present but very weak, HR=120 bpm, CRT=3 seconds   |
| 12. | Load and go  | 12. | <b>Possible Shock</b>   |
| 13. | Spinal immobilization with 3 or 4 straps, head immobilizer and tape, assure padding under shoulders, (include C-collar if correct size is available) | 13. | Strap torso and legs to LBB before taping/strapping head to the board, if correct C-collar size not available use towel roll and tape |

14. Reassess ABC's and mental/neuro status (always reassess after moving patient)

15. Detailed assessment: head to toe examination - head, neck, chest abdomen, pelvis, lower extremities, and upper extremities

16. Keep patient warm

17. Reassess patient PRN

Pulse=120 bpm, weak brachial

18. Continue assisting ventilations via BVM with 100% oxygen

14. Airway open, RR=24, good chest rise, breath sounds equal & clear, brachial pulses weak, HR=120 bpm, skin pinkening up, cool, diaphoretic, CRT=3 seconds, groans in response to painful stimuli, pupils equal & reactive

15. No injuries assessed to head, neck, chest, pelvis or upper extremities. Abdomen distended, left thigh tender with hematoma

16. Cover patient with blanket

17. LOC=groans to painful stimulus  
Pupils=equal and reactive  
Airway=open, clear  
Breathing=20 – 24, assisted

Skin=pinking up, cool  
CRT=3 seconds

18. BVM with 100% oxygen, rate 20 - 24

### **Knowledge Points:**

1. After respiratory distress, shock is the most frequent cause of cardiopulmonary arrest in the pediatric patient. It is always considered a load-and-go situation.
2. The child's ability to constrict arteries and veins is much better than the adult, therefore they compensate for blood loss much better than the adult. A normal or near normal blood pressure in the face of blood loss is a very common occurrence in children. In a trauma situation, a normal blood pressure in a child, does not rule out shock in children.
3. Shock in the pediatric patient is most often due to volume loss or mal-distribution of circulatory volume.
4. Capillary refill time and peripheral pulses are the most reliable indicators for assessing circulation in a child.
5. Obtaining a reliable blood pressure in the pediatric patient can be very difficult. It is important to use the correct sized blood pressure cuff. The sounds heard when obtaining a blood pressure are difficult to hear in the pediatric patient. Normal blood pressures vary with the age of the child. The caregiver must be familiar with the normal ranges of all age groups of pediatric patients, in order to properly interpret the blood pressure readings. If a proper sized cuff is available, a blood pressure should be taken as a baseline, and then repeated periodically to measure for a trend.
6. In the presence of a head injury, shock will be the leading cause of death. If the patient has a head injury and severe bleeding, it is important to treat the shock first.
7. Distributive shock can be caused by two primary reasons in the pediatric patient.
  - ❖ Hypovolemia - circulation volume loss due to bleeding or dehydration
  - ❖ Mal-Distribution - circulating volume is pooled in a larger vascular space because of vasodilation caused by a toxic substance - infection (sepsis) or an allergen (anaphylaxis)
8. Anaphylaxis occurs when the child is exposed to an allergen. They will appear very ill, have a sudden onset of wheezing, and have a blotchy rash (hives/urticaria) that itches. The allergen eventually causes massive vasodilation, resulting in shock.
9. Sepsis is a severe infection that reaches the blood stream, and it results in massive vasodilation and shock. The child will be cool instead of hot and will have a fine rash called petechiae or purpura. The child usually has a history of being ill for several days.
10. Dehydration can lead to shock because the patient loses large amounts of fluid by sweating, or massive vomiting and/or diarrhea. The child is usually too ill to take

**in enough fluids to counter act the loss of fluid.**  
**TRAUMA SCENARIO - 4**

You are called to an MVC where a ten-year-old has been ejected from the back of a pickup truck.

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Mechanism of Injury, Number of Patients, Additional Resources, Scene Safety	1. Patient found lying supine on the ground, ejection from a moving vehicle, blunt force trauma, awake, moving around, looks pale, 1 patient, scene is safe, ETA on transport unit 15 minutes
2. Assess general appearance, assess from a distance, assess for spontaneous movement, assess airway, listen for audible breath sounds, observe respiratory effort, LOC (AVPU)	2. Spontaneous movement, awake, mumbling incoherently airway open, no audible breath sounds, RR=28, mild distress
3. Log roll(while manually immobilizing C-spine) onto long backboard with under shoulders	3. Patient doesn't resist C-spine efforts, maintain manual padding stabilization until head is taped/ strapped to the LBB
4. Place head in neutral position, jaw thrust/chin lift, assess airway look, listen and feel, reassess respiratory effort, assess breath sounds, assess skin color, assess symmetry of chest, maintain C-spine	4. Airway open and clear, spontaneous respirations, RR=28, mild retractions, breath sounds equal & clear, normal symmetrical chest rise, skin pale
5. Administer O2 6 -10 liters by non re-breather mask	5. Patient tolerates mask, acceptable symmetrical chest rise, breath sounds equal &

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| 6. Assess circulation: skin color/temp radial/brachial pulses and capillary refill  | 6. clear, skin still pale<br>HR = 120 bpm, radial pulse is palpable but weak and is present only in the right wrist, extremities cool/pale, CRT=5 seconds |
| 7. Assess for obvious external hemorrhage   | 7. No external bleeding is found  |
| 8. Note mental status (AVPU), assess pupils, muscle tone, grip strength, response to painful stimuli  | 8. Awake but incoherent, pupils unequal, L > R, sluggish to respond, good muscle tone, withdraws from painful stimuli                                     |
| 9. Reassess airway & respiratory efforts, breath sounds, skin color   | 9. No change in respiratory effort, slight retraction, increased work of breathing, RR=30, breath sounds equal & clear, skin pale                         |
| 10. Reassess circulation: skin color/temp brachial/radial pulse, CRT  | 10. Radial pulse on R slightly stronger, no radial pulse on left, skin pale, diaphoretic CRT=5 seconds  |
| 11. Load and go   | 11. <b>Possible Head Injury</b>   |
| 12. Spinal immobilization with 3 or 4 straps, head immobilizer, and tape place padding under shoulder if needed (include C-collar if correct size is available) | 12. Strap torso and legs to LBB before taping/strapping head to the board, if correct C-collar size not available use towel roll and tape                 |

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| 13. Reassess ABC's, mental/neuro status (always assess after moving patient)   | 13. Airway open, RR=30, slight retraction, slight decrease in work of breathing, radial pulse present/weak on R absent on L, HR=120 bpm skin pinkening up, cool diaphoretic, CRT=5 seconds awake, incoherent, moves all extremities spontaneously, pupils unequal, L > R, slow to respond |
| 14. Detailed assessment: head to toe examination - head, neck, chest, abdomen, pelvis, lower extremities upper extremities | 14. No injuries assessed to head, neck, abdomen, lower extremities, crepitus L anterior and lateral chest, breath sounds equal & clear, L mid-forearm swollen, tender, deformity, pulse absent  |
| 15. Reposition L forearm in attempt to return pulse and splint   | 15. Pulse does not return   |
| 16. Keep patient warm  | 16. Cover patient with blanket, splint arm fracture enroute   |
| 17. Reassess patient PRN   | 17. LOC=awake, incoherent<br>Pupils=unequal, L > R<br>Airway=open and clear<br>Breathing=30, slight Retraction<br>Pulse=120 bpm in R arm, still Absent in L arm<br>Skin=pinkening up, cool<br>Diaphoretic<br>CRT=5 seconds  |
| 18. Continue to deliver O2 via Non re-breather mask  | 18. Adequate chest rise, breath sounds equal & clear, color   |

**Knowledge Points:**

1. Head injury, in pediatric trauma situations, should be suspected until proven otherwise.
2. Head trauma contributes to 80% of pediatric trauma mortality, with over 60% of pediatric major trauma victims, having a significant head injury.
3. In the pediatric patient, the head makes up a larger proportion of the child's total body mass. The child also has relatively weaker neck and extremity muscles and is less able to protect the head from injuries.
4. Head injury, with Increased Intracranial Pressure (ICP), is the cause of most pediatric trauma mortality. ICP occurs, when the brain swells or blood starts to fill up the limited space within the skull, there is very limited accommodating space. The only place for it to go is through the opening in the base of the skull where the spinal cord passes through, known as the foramen magnum. As the swelling or bleeding increases and pressure builds, the brain will actually be pushed through the foramen magnum. This condition, known as herniation, results in death.
5. A decrease in oxygen levels and an increase level of carbon dioxide to the brain will also contribute to ICP. With head injury, as the ICP increases the patient's level of consciousness decreases. As the level of consciousness decreases, the respiratory rate decreases, causing hypoxia in the brain. As hypoxia increases, ICP increases. It is imperative that an altering of mental status be assessed early and oxygenation be given quickly in order to try and reverse the effects of ICP on the brain. The best way to accomplish this is to hyperoxygenate the patient by delivering 100% oxygen via bag valve mask at a higher rate. If the patient is an infant their breathing range is 30 – 40; you would hyperoxygenate at a rate of 40 to help reduce ICP. Frequently assess the patient's mental status, using the AVPU method; in order to discover changes in mental status early. Discovering altered mental status early and hyperoxygenation are the two best methods available to combat ICP in the head injury patient.
6. The early signs of Increased Intracranial Pressure are headache, nausea, vomiting, and altered mental status. As the condition worsens, the pupil on the injured side will begin to dilate. Decorticate (legs extended and arms flexed towards the body and Decerebrate (extension of all four extremities) posturing in may occur which indicates impending brain herniation. This is an ominous sign.

## **TRAUMA SCENARIO - 5**

You are called to an MVI on a cold winter night to a five year old child who was sleeping unrestrained in the back seat of a car involved in a head on collision that occurred about twenty minutes ago. Extrication efforts have just freed the child who is being brought to you on a long backboard.

### **Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Mechanism of Injury, Number of Patients, Additional Resources, Scene Safety	1. Fire/1st responders bring you the patient already immobilized on a back board, head on collision/unrestrained blunt force trauma, 1 patient, scene is safe, ETA on ALS unit is 15 minutes
2. Assess general appearance from a distance, assess for spontaneous movement, assess airway, assess for audible breath sounds, observe respiratory effort, LOC (AVPU)	2. No spontaneous movement color is dusky, snoring respirations, increased work of breathing, responds to deep pain only
3. Reassess jaw thrust/chin lift, reassess airway, look, listen and feel, reassess respiratory effort, auscultate breath sounds assess symmetry of chest, assess skin color,	3. Airway obstruction relieved with jaw thrust and positioning RR=8, shallow, chest symmetrical, breath sounds equal & clear, skin cyanotic
4. Begin PPV with BVM and 100% oxygen and oral airway, rate 20 - 24 assess breath sounds, assess chest rise	4. Patient has no gag reflex, breath sounds clear & equal, chest rise symmetrical, skin cyanotic

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| 5. Assess circulation: brachial/radial pulses, assess skin and capillary refill  | 5. Radial pulses are weak palpable, HR=90 bpm, skin cold, cyanotic, diaphoretic CRT=5 seconds   |
| 6. Assess for obvious external hemorrhage  | 6. Bleeding is not present  |
| 7. Note mental/neuro status (AVPU), assess pupils, muscle tone, grip strength, response to painful stimuli                   | 7. Responds only to deep pain, no spontaneous movement, pupils dilated, slow to respond   |
| 8. Reassess airway and respiratory efforts, breath sounds, skin color  | 8. Airway open, no improvement in respiratory effort, RR=8, shallow, breath sounds equal & clear, skin cyanotic   |
| 9. Reassess circulation: skin color/temp, brachial/radial pulses, CRT  | 9. No improvement, radial pulses weak, HR=90 bpm, skin cold, cyanotic, CRT=5 seconds  |
| 10. Load and go  | 10. <b>Altered Mental Status/<br/>Hypothermia</b>   |
| 11. Keep patient warm  | 11. Cover with blanket, turn up heat in ambulance   |
| 12. Reassess ABC's, and mental/neuro status (always reassess after moving patient)   | 12. Unresponsive to voice but more responsive to pain, airway open, no change in respiratory effort, RR=8, shallow, adequate chest rise with assisted ventilations, radial pulses stronger, skin continues to pink up, CRT=4, pupils quicker to react |
| 13. Detailed assessment - head to toe, examination - head, neck, chest, abdomen, pelvis, lower extremities upper extremities | 13. No evidence of obvious injury discovered, level of consciousness continues to improve   |

14. Reassess PRN

14. LOC=responsive to pain but not to voice  
Pupils=equal & reactive  
Airway=open & clear  
Breathing=10, shallow  
Pulse=90 bpm, strong radial  
Skin=pinking up, cool, dry  
CRT=4 seconds

15. Continue to assist ventilations via BVM and warm patient

15. Patient continues to improve

### **Knowledge Points:**

1. Thermal Stress or Hypothermia can cause the pediatric patient to deteriorate rapidly.
2. Children have a relatively large body surface area in proportion to their body weight. This causes the child to lose body heat more rapidly than the adult.
3. Children in shock quickly develop hypothermia from exposure and metabolic acidosis (a condition that develops from hypoxia). Hypothermia can also cause a child to use glucose stores more rapidly. This could cause the child to become hypoglycemic. The brain needs two kinds of fuel to survive - Oxygen and Glucose. If the patient becomes hypothermic it could cause a worsening of the conditions acidosis and hypoglycemia, thus depriving the brain of essential fuels. If this occurs, brain damage will occur.
4. It is very important to keep the pediatric patient from becoming hypothermic. If they are wet, dry them off. Keep them covered as much as possible with a sheet or blanket. Since the head is proportionately larger than the body, it is a major source of heat loss. Keeping the head covered will help reduce the risk of heat loss from the head.

## **Trauma Scenario - 6**

(Hypovolemia/Abdominal Trauma)

You are called to the scene of a 10-year-old boy ejected from the back of a pick up truck.

### **Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Mechanism of Injury, Number Of Patients. Additional Resources, Scene Safety	1. Patient found supine on the ground, ejection blunt force trauma, mumbling, incoherent, 1 patient, scene is safe, transport unit is 15 minutes away
2. Assess general appearance from a distance, assess spontaneous movement, assess airway, listen for audible breath sounds respiratory effort, LOC (AVPU)	2. Pale, moving all extremities, airway open, no audible breath sounds, RR=28, slightly labored, good chest rise, responds inappropriately to verbal commands/questions
3. Manually immobilize C-spine, jaw thrust, head in the neutral position, assess airway, look, listen and feel, reassess respiratory effort, auscultate breath assess symmetry of chest, skin color	3. Maintain manual stabilization until head is taped/strapped to the LBB, airway open, RR=28, sounds, slightly labored, symmetrical rise, chest rise, breath sounds equal and clear, skin pale
4. Administer 6 - 10 liters of oxygen via non re-breather mask	4. Patient accepts mask, good chest rise, breath sounds clear, skin still pale, diaphoretic
5. Assess circulation: brachial/radial pulses, color/temp and capillary refill	5. Carotid pulse =120 bpm, brachial pulse not palpable in L arm, present in R arm, skin pale, cool diaphoretic, CRT= 5 seconds

6.	Assess for obvious external hemorrhage	6.	No obvious external bleeding present
7.	Note mental/neuro status (AVPU), assess pupils, muscle tone, grip strength, responses to painful stimuli	7.	Responds inappropriately to questions, unable to follow verbal commands, pupils equal sluggish to respond, good muscle tone, responds appropriately to painful stimuli
8.	Reassess airway and respiratory efforts, breath sounds, skin color	8.	Increasing respiratory effort, RR=36, airway open, breath sounds equal & clear, skin still pale, cool, diaphoretic
9.	Reassess circulation: brachial/radial pulses, skin color/temp, CRT	9.	Weak brachial pulse present in R arm only, skin pale, cool, diaphoretic, CRT=4 seconds
10.	Load and go	10.	<b>Hypovolemic Shock/Possible Abdominal Trauma</b>
11.	Spinal immobilization with 3 or 4 straps, head immobilizer and tape, assure padding under shoulders, (include C-collar, if correct size available)	11.	Strap torso and legs to LBB before taping/strapping head to the board, appropriate C-collar available, shoulders padded
12.	Reassess ABC's and mental/neuro status (always reassess after moving patient)	12.	Airway open, RR=36, labored, good chest rise, breath sounds equal & clear, weak brachial pulse in R arm only, skin pale, cool, diaphoretic, CRT=4 seconds, responds inappropriately to verbal commands
13.	Detailed assessment: head to toe examination – head, neck, chest, abdomen, pelvis, lower extremities,	13.	No injuries assessed to head, crepitus to L upper chest, L shoulder pain, tenderness/

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|     | upper extremities                                      |     | swelling to L mid-forearm.   |
| 14. | Keep patient warm                                      | 14. | Cover patient with a blanket   |
| 15. | Reposition L arm in attempt to return pulse and splint | 15. | Pulse does not return  |
| 16. | Reassess PRN, SAMPLE history                           | 16. | LOC=inappropriate response to verbal response<br>Pupils=equal & sluggish to react<br>Airway=open & clear<br>Breathing=36, labored<br>Pulse=120 bpm, R brachial only<br>Skin=pale, cool, diaphoretic<br>CRT=4 seconds<br>S=RR=36, labored, HR=120 bpm, skin pale, cool diaphoretic, AMS, B/P 90/64<br>CRT=4 seconds<br>A=none<br>M=none<br>P=none<br>L=lunch<br>E=ejected from pickup truck |
| 17. | Continue to support respiratory status and keep warm   | 17. | Oxygen 10 liters per minute via non re-breather mask   |

## **Knowledge Points:**

### **1. Pulse deficit**

**When suspicion of a fracture to the extremities exists assessing pulses is important. Absent pulses in a fractured extremity, could indicate pinching off of an artery by a broken bone end. Lack of circulation can cause tissue damage and death. It is imperative to restore circulation as quickly as possible. Gentle repositioning of the fracture site can sometimes remove the pressure of the bone ends from an artery and return circulation. If gentle repositioning doesn't work, splint the fracture to prevent further movement of the bone ends. Rapid transport is imperative if circulation cannot be restored.**

### **2. Abdominal trauma is the second leading cause of traumatic death in the pediatric patient. The abdomen is also the most common site of bleeding in the pediatric trauma victim. This principally is due to the fact that the liver and spleen are relatively larger (body proportion) in the child when compared to the adult. These organs are vulnerable in the for child for three reasons:**

- ❖ The abdominal wall is thin so the organs are closer to the surface.**
- ❖ The abdominal wall is less muscular in the child than in the adult.**
- ❖ The liver and spleen are lower in the abdomen in the child than in the adult.**

### **3. If signs and symptoms of shock are present, in the pediatric patient, have a very high suspicion of abdominal trauma and hidden bleeding that can be very life threatening. Abdominal tenderness and rigidity do not have to be present for serious bleeding to be present and the child's life be in danger.**

**Trauma Scenario - 7**  
(Penetrating Chest Injury)

You respond to an eight-year old boy run over by a tractor/lawnmower.

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Mechanism of Injury, Number Of Patients, Additional Resources	1. Patient lying supine on the ground on his right side, he is bleeding profusely from a deep wounds to his upper extremities, He also has a large gaping wound to the mid-axillary region of the right side of his chest, he is crying for his mother, 1 patient, scene is safe, ETA for ALS unit is 10 minutes
2. Assess general appearance from a distance, assess spontaneous movement, assess airway, listen for audible breath sounds, assess respiratory effort, LOC (AVPU)	2. Alert, responding to all stimuli, moving all extremities, airway open and clear, no audible breath sounds, RR=24, increased work of breathing
3. Manually immobilize C-spine, jaw thrust, head in the neutral position, assess airway, look, listen and feel, reassess reassess respiratory effort, auscultate breath sounds, assess symmetry of chest rise, assess skin color	3. Manually immobilize C-spine, airway open & clear, RR=24 labored, breath sounds equal good chest symmetry, skin pale no bubbling or crepitus observed, chest wound
4. Administer 6 - 10 liters of oxygen via non re-breather mask and seal chest wound with occlusive dressing, control any bleeding with pressure dressing	4. Patient accepts mask, good chest rise, breath sounds equal clear, skin pale, bleeding controlled

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| 5.  | Assess circulation: brachial/radial pulses, skin color/temp and capillary refill  | 5   | Weak radial pulse, HR=125 bpm, pale, cool, diaphoretic, CRT=4 seconds   |
| 6.  | Assess for obvious external hemorrhage  | 6.  | Perfuse bleeding from arm wounds, apply direct pressure with gloved hands, apply pressure dressings and bandage.  |
| 7.  | Note mental/neuro status (AVPU), assess pupils, muscle tone, grip strength  | 7.  | Alert, responds well to all stimulus, pupils equal and reactive, good muscle tone and grip strength   |
| 8.  | Reassess airway and respiratory efforts, breath sounds, skin color  | 8.  | Airway open and clear, RR=36, labored, clear bilateral breath sounds, skin pale, cool, diaphoretic  |
| 9.  | Reassess circulation: brachial/radial pulses, skin color/temp, CRT  | 9.  | Radial pulses absent, brachial pulse present & weak, HR=130 bpm, skin pale, cool, diaphoretic, CRT=4 seconds  |
| 10. | Load and go   | 10. | <b>Penetrating Chest Injury/ Hypovolemia</b>  |
| 11. | Spinal immobilization with 3 or 4 straps, head immobilizer and tape, assure padding under shoulders, <b>(include C-collar if correct size is available)</b> | 11. | Strap torso and legs to LBB before taping/strapping head to the board, correct C-collar available, shoulders padded   |
| 12. | Reassess ABC's and mental/neuro status <b>(always reassess after moving patient)</b>  | 12. | Airway open & clear, RR=36, breath sounds equal & clear, HR=130 bpm, weak brachial pulse, CRT=4 seconds, skin pale, cool, diaphoretic, awake but becoming less alert, B/P=80/55 |

13. Detailed assessment: head to toe examination - head, neck, chest, abdomen, pelvis, lower extremities,

14. Keep patient warm

15. Reassess PRN, SAMPLE history

16. Continue to support respiratory status and keep warm

13. No injuries assessed to head, neck, abdomen, pelvis or lower extremities, deep lacerations to upper arms, R lateral chest, bleeding controlled

14. Cover patient with a blanket

15. LOC=decreasing  
Pupils=equal and reactive  
Airway=open & clear  
Breathing=36, labored  
Pulse=130 bpm, weak brachial  
Skin=pale, cool, diaphoretic  
CRT=4 seconds  
S=RR=36, labored, HR=130  
weak brachial, skin pale, cool, diaphoretic, AMS, B/P=80/54, CRT=4 seconds  
A=none  
M=none  
P=none  
L=breakfast  
E=run over by a lawnmower

16. 10 liters of oxygen by non-re-breather mask, reevaluate bandages and chest seal, reassess breath sounds for signs of impending pneumothorax

### **Knowledge Points:**

1. Penetrating injuries, to the chest, can cause a change in the pressure gradients within the lungs, this can lead to a life threatening condition, known as a tension pneumothorax. When a hole is created in the chest wall, it allows air to abnormally enter the chest cavity. As air enters the chest through this artificially created airway, it causes air to buildup within the chest cavity. This creates a negative air pressure gradient that will cause the lung to collapse, and cause pressure to push against the heart. This not only compromises ventilation/oxygenation, but it will cause severe problems with circulation. The combination of the two will lead to death quickly, unless actions are taken to seal the hole creating the artificial airway. Sealing the hole, with an occlusive substance, is the best way to treat this condition. The best material to use for an occlusive dressing is aluminum foil. It should be taped on 3 sides, in order to create a flap, which will keep air out during inspiration, but let it out during expiration. Taping the seal on three sides creates a flutter type valve, and controls air going in and out. If after placing an occlusive seal dressing on an open chest wound, the patient has more difficulty breathing, or if the patient is being ventilated with a BVM and it becomes harder to bag the patient, you must burp the seal. This is accomplished by lifting the corner of the seal, and allowing trapped air to escape. The seal is then re-taped.
  
5. Signs and symptoms of a tension pneumothorax include:
  - ❖ increased difficulty breathing
  - ❖ decreased breath sounds on the affected side
  - ❖ increased pulse
  - ❖ drop in blood pressure
  - ❖ distended jugular neck veins
  - ❖ trachea shifting to the side opposite of the injury.

**Trauma Scenario - 8**  
(Isolated Head Injury)

You respond to the scene of a three year old girl who fell out of a third story window.

**Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Scene Size-Up, PPE/BSI, Determine Mechanism of Injury, Number Of Patients, Additional Resources, Scene Safety	1. Small child lying on L side on the ground, crying, fall > 15 feet, 1 patient, scene is safe, ETA on ALS unit is 20 minutes
2. Assess general appearance from a distance, assess spontaneous movement, assess airway, listen for audible breath sounds, assess respiratory effort, LOC (AVPU)	2. Child is crying, airway open, moving extremities spontaneously, no audible breath sounds, RR=32, non-labored, awake, speaking clearly, eyes clear and focus on objects
3. Manually immobilize C-spine, jaw thrust, head in the neutral position, assess airway, look, listen and feel, reassess respiratory effort, auscultate breath sounds, assess symmetry of chest rise, assess skin color	3. Immediately attempt to manually immobilize the C-spine, child doesn't resist as long as you keep talking quietly to her and reassuring her, airway open & clear, breath sounds equal and clear, good chest symmetry, skin color pink
4. Administer 6 - 10 liters of oxygen via non-re-breather mask	4. Patient accepts mask, acceptable chest rise, breaths sounds clear, skin pink
5. Assess circulation: brachial/radial pulses, skin color/temp and capillary refill	5. Brachial and radial pulses present, HR=118 bpm, skin pink, warm & dry, CRT=2 seconds

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| 6.  | Assess for obvious external hemorrhage   | 6.  | No obvious external hemorrhage   |
| 7.  | Note mental/neuro status (AVPU), assess pupils, muscle tone, grip strength, response to painful stimuli  | 7.  | Alert, speaking clearly, answers "Cathy" when asked her name and "3" when asked how old she is, pupils equal and reactive, good muscle tone, equally squeezes your fingers when asked to, says "ouch" when she is pinched  |
| 8.  | Reassess airway and respiratory efforts, breath sounds, skin color   | 8.  | Airway open & clear, RR=32 non-labored, good chest rise, breath sounds equal & clear, skin pink, warm and dry  |
| 9.  | Reassess circulation: brachial/radial pulses, skin color/temp, CRT   | 9.  | Radial/brachial pulses present, HR=118 bpm, skin pink, warm, dry, CRT=3 seconds  |
| 10. | Load and go  | 10. | <b>Possible Isolated Head Injury</b>   |
| 11. | Spinal immobilization with 3 or 4 straps, head immobilizer and tape assure padding under shoulders, <b>(Include C-collar if correct size available )</b> | 11. | Strap torso and legs to the LBB before taping/strapping head to the board, (if correct sized C-collar is not available, utilize towel roll and tape), shoulders padded   |
| 12. | Reassess ABC's and mental/neuro status <b>(always reassess after moving patient)</b>   | 12. | Airway open, RR=36 slightly shallow, adequate chest rise, breath sounds equal & clear, radial pulse 120 bpm, skin pink, warm & dry, appears sleepy, less responsive, opens eyes when you talk to her but she can't tell you her name, pupils becoming unequal, L>R |

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| <p>13. Detailed assessment: head to toe examination - head, neck, chest, abdomen, pelvis, lower extremities, upper extremities</p> <p>14. Keep patient warm</p> <p>15. Reassess PRN, SAMPLE history</p> | <p>13. No injury found to the neck, chest, abdomen, pelvis, lower &amp; upper extremities, ecchymosis to the left side of the forehead, small amount blood trickling from the L ear,</p> <p>14. Cover patient with a blanket</p> <p>15. LOC=AMS<br/>Pupils=L&gt;R, unequal<br/>Airway=open &amp; clear<br/>Breathing=36, increasingly shallow<br/>Pulse=120 bpm, radial, strong<br/>Skin, pink, warm, dry<br/>CRT=3 seconds<br/>S=RR=36 , HR=124 bpm, radial, strong, skin, pink, warm, dry, decreasing mental status, CRT=3 seconds, B/P=96/60<br/>A=none<br/>M=Dimetapp, for a cold<br/>P=only a cold<br/>L=breakfast<br/>E=Mother states, "She was sitting in the window seat and leaned against the window and just fell"</p> <p>16. 100% oxygen, 10 liters/minute, via non re-breather mask</p> |
| <p>16. Continue to support respiratory status and keep warm</p>   |  |

### **Knowledge Points:**

- 1. Head injury, in pediatric trauma situations, should be suspected until proven otherwise.**
- 2. In the pediatric patient, the head makes up a larger proportion of the child's total body mass. The child also has relatively weaker neck and extremity muscles and is less able to protect the head from injuries.**
- 3. Head injury, with Increased Intracranial Pressure (ICP), is the cause of most pediatric trauma mortality. ICP occurs when the brain swells or blood starts to fill up the limited space within the skull, there is very limited accommodating space. The only place for it to go, is through the opening in the base of the skull, where the spinal cord passes through, known as the foramen magnum. As the swelling or bleeding increases, and pressure builds, the brain will actually be pushed through the foremen magnum. This condition, known as herniation, results in death.**
- 4. A decrease in oxygen levels and an increase level of carbon dioxide to the brain will also contribute to ICP. With head injury, as the ICP increases the patient's level of consciousness decreases. As the level of consciousness decreases, the respiratory rate decreases, causing hypoxia in the brain. As hypoxia increases, ICP increases. It is imperative that an altering of mental status be assessed early and oxygenation be given quickly in order to try and reverse the effects of ICP on the brain. The best way to accomplish this is to hyperoxygenate the patient by delivering 100% oxygen via bag valve mask at a higher rate. If the patient is an infant their breathing range is 30 – 40; you would hyperoxygenate at a rate of 40 to help reduce ICP. Frequently assess the patient's mental status, using the AVPU method, to discover changes in mental status early. Discovering altered mental status early, and hyperoxygenation, are the two best methods available to combat ICP, in the head injury patient.**
- 5. The early signs of Increased Intracranial Pressure are headache, nausea, vomiting and altered mental status. As the condition worsens, the pupil on the injured side will begin to dilate. Decorticate (legs extended and arms flexed towards the body) and Decerebrate (extension of all four extremities) posturing in may occur which indicates impending brain herniation. This is an ominous sign.**
- 6. When suspicion of a fracture to the extremities exists, assessing pulses are important. Absent pulses in a fractured extremity, could indicate pinching off of an artery by a broken bone end. Lack of circulation can cause tissue damage and death. It is imperative to restore circulation as quickly as possible. Gentle repositioning of the fracture site can sometimes remove the pressure of the bone ends from an artery, and return circulation. If gentle repositioning doesn't work, splint the fracture to prevent further movement of the bone ends. Rapid transport is imperative if circulation cannot be restored.**

# **NEWBORN SKILL STATION**

## **Objectives**

1. To emphasize the importance of preparation for the resuscitation of the newborn infant prior to delivery.
2. To teach the criteria for progressing to more aggressive methods of resuscitation of the newborn.
3. To emphasize the importance of drying, warming and stimulating as integral components of a newborn resuscitation.
4. To review the special needs of the meconium stained newborn and very small newborn.
5. To discuss the ethical considerations when faced with the resuscitation of the very small premature infant.

## **Time**

60 minutes

## **Students**

6 students/station

## **Instructors**

1 instructor

## **Facility**

A small room with a stretcher

## **Equipment**

- \*1 resusci-baby with stimulated umbilical cord
- \*1 pediatric jump kit with basic equipment including neonatal sized BVM with assorted sized masks, oral airways, stethoscope, pen light, gloves, water proof gown, masks, neonatal oxygen mask , neonatal nasal cannula
- \*1 small doll (for premature newborn scenario with stimulated umbilical cord)
- \*4 towels/blankets
- \*1 stockinette for warming newborn's head
- \*1 Chemstrip bottle
- \*1 OB kit with cord clamp and bulb syringe

## **Organization**

There are two methods for presenting the newborn resuscitation scenarios. In the first, two students are chosen for each scenario. An additional student may be chosen to role-play a grandmother or neighbor, as each scenario dictates. A scenario is then presented and managed, in an interactive fashion, between the instructor and the two students. After the scenario, the other students in the group, are asked to critique the management they observed. Additional, “what-if” questions, should then be posed to the entire group before progressing to the next scenario. In the first three scenarios, in this skill station, unacceptable responses have not been listed. For responses, other than those listed, the instructor must assign a patient outcome for that response, based upon the instructor’s knowledge of the infant’s underlying diagnosis, listed at the beginning of each scenario, for the instructor’s use only.

In the second, two students are chosen for each scenario. The scenario is presented, and managed, in an interactive fashion, between the instructor and the two students. After each scenario, the instructor presents a didactic review of the knowledge points, listed at the end of that scenario. In particular, for the scenarios in this skill station, compared to those in the first method, there is less instructor-student interaction. Therefore, the instructor must be prepared to discuss the knowledge points, and other issues suggested by the scenario in more detail.

## **Newborn Scenario - 1**

(Preemie who Responds to PPV)

A twenty-five year old woman calls you to the scene of an imminent delivery. She began having cramps four hours ago and she passed amniotic fluid half an hour ago. However, her cramps began to come very close together and she feels like pushing.

A grandmother is present who has helped deliver a baby before.

Is there any other information that you would try to obtain quickly that would be of immediate importance to the newborn resuscitation? (prenatal history)

### **Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Have you been receiving prenatal care	1. Yes, every month since 2 <sup>nd</sup> month
2. Any complications with pregnancy	2. No, normal pregnancy
3. How many other previous pregnancies	3. None
4. Color and odor of amniotic of fluid	4. Fluid was clear, clean odor
5. Due date	5. 8 weeks from now
6. Single or multiple birth	6. Single is known

You decide that you have a maximum of five minutes. You are a two person team and your partner goes to attend to the mother. The grandmother will coach the mother during delivery while you attend the baby. (Pick one student to be the leader of the resuscitation.) How would you use the next five minutes?

### **Expected Responses**

1. Assign roles:
  - a. Airway/Ventilation (leader)
  - b. Dry/warm/stimulate/monitor and support circulation if necessary (other Rescuer)
  - c. Assign grandmother to coach and comfort mother
2. Prepare space
  - a. Adequate room to care for mother and baby
  - b. Well-lighted
  - c. Warm

- d. Quiet
- 3. Prepare equipment
  - a. Airway
    - 1. Bulb-syringe
    - 2. Yankauer suction catheter/portable suction
    - 3. Oral airways
  - b. Breathing
    - 1. O2 tank
    - 2. O2 masks
    - 3. Neonatal sized BVM unit with reservoir and appropriate sized masks
    - 4. Oxygen tubing
  - c. Drying and warming equipment
    - 1. Warm towels or blankets
    - 2. Optional: silver swaddler
    - 3. Stockinette for the head
    - 4. Consider raising temperature in the house
  - e. Other equipment
    - 1. OB kit with all appropriate items including cord clamp, sterile drapes, scalpel, 4 x 4's (sterile), sanitary pad
    - 2. Chemstrips

The baby is delivered. He is small, premature, blue and does not cry. He takes a couple of deep gasps and becomes apneic and floppy. How would you proceed?

**Expected Responses:**

(The two Rescuers should work simultaneously)

<u>Rescuer</u>	<u>Instructor's Responses</u>
1. Utilize infection control measures, 1. PPE/BSI	Apply gloves (sterile), water proof gown, face mask, eye protection, avoid touching vaginal area or baby with anything that isn't sterile
2. Quickly clamp and cut cord and place baby on the prepared space	2. Feel for a pulse in umbilical cord first, should wait for cord to stop pulsating before cutting

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|-----|---|-----|--|
| 3.  | Position flat surface (sterile drape), open airway – air sniffing position, jaw thrust/chin lift, look, listen and feel, assess respiratory effort, assess breath sounds, assess skin color, suction nose and mouth with bulb syringe | 3.  | Airway obstructed with secretions, RR=0, no spontaneous chest rise, respiratory efforts or breath sounds, cyanotic, secretions clear |
| 4.  | Begin PPV with BVM with 100% O <sub>2</sub> and oral airway ( <b>first two breaths should be delivered rapidly with out O<sub>2</sub></b> ) at 40 (just enough for adequate chest rise), assess breath sounds, assess skin color      | 4.  | Patient has no gag reflex, breath sounds are equal & clear, good chest symmetrical rise, cyanotic                                    |
| 5.  | Assess circulation: brachial/umbilical pulse, skin color/temp, capillary refill   | 5.  | Umbilical pulse felt, HR=80bpm, cyanotic, cool, CRT=5 seconds  |
| 6.  | Dry baby off with sterile towels or 4x4's, stimulate (rub vigorously, thump feet) warm baby (wrap in blanket/sliver swaddler and cover head with cap)   | 6.  | Baby apneic, RR=0, cyanotic, no spontaneous movement, no chest rise  |
| 7.  | Reassess airway, respiratory effort chest rise, skin color, pulse   | 7.  | Poor chest rise, secretions still in airway, apneic, HR remains between 80 – 100 bpm umbilical, cyanotic                             |
| 8.  | Reassess jaw thrust, if oral airway not inserted insert, slightly increase ventilation pressure for 1 or 2 breaths, then return to previous ventilation pressures, watch chest rise   | 8.  | Good chest rise, trunk pinking up, HR=100 bpm, infant begins gasping   |
| 9.  | Continue drying, warming and stimulating  | 9.  | Baby continues to improve  |
| 10. | Continue BVM until infant develops regular respirations   | 10. | After 5 minutes of ventilating, infant has regular rhythmic breathing with grunting, nasal flaring and                               |

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| <p>11. Stop bagging and switch to mask/11. nasal cannula O2 because of respiratory distress (3L/min by nasal cannula preferred because of cooling effect of more rapid flows by mask) Keep warm.</p> | <p>retractions, RR=48<br/>If O2 is not used - infant becomes dusky, otherwise infant trunk remains pink but in respiratory distress</p> |
| <p>12. Check chemstrip prior to transport.</p>   | <p>12. Chemstrip = 80</p>   |
| <p>13. Load and go</p>   | <p>13. <b>Premature Infant with Respiratory Compromise/Distress</b></p>   |
| <p>14. Reassess ABC's status (always reassess after moving patient)</p>  | <p>14. Airway open, RR=54, HR=140 bpm, trunk pink, extremities cyanotic, warm, dry, spontaneous movement observed</p>                   |

**Expected Responses:**

1. Keep warm
2. Continue oxygen (have a bag and mask available)
3. Show baby to mother (but do not compromise monitoring in the process)
4. Monitor baby's color during transport - color change (cyanosis) is an early sign of distress in the newborn than in the older infant and child.
5. Continue to assess pulse rate (bradycardia is an early warning sign of increasing respiratory distress).

### **Knowledge Points:**

1. Obtaining a good prenatal history can help determine if possible complications may arise for the baby and the mother during childbirth.
2. Infection control is extremely important during childbirth. Foremost, it is paramount to protect the rescuer from contamination. There are copious amounts of blood and other body fluids present during childbirth. Rescuers must wear gloves, water proof gown (to protect their clothing), a face mask (to prevent secretions from splashing into the nose and mouth) and goggles (to prevent splashing into the eyes). It is also important to protect the neonate from contamination by infectious substances from the mother and the rescuers. When preparing the mother for delivery, drape her with sterile material (in the OB kit) and prepare a sterile birthing area. If possible, when drying the infant off, utilize sterile towels and 4x4's. Utilize sterile gloves whenever handling the neonate.
3. Neonates usually have secretions in their mouth and nose at birth and must be removed. The simplest way to remove secretions from an infant's airway is with the bulb syringe included in the OB kit. Utilizing it properly, is the key to good airway management. Before placing the tip of the bulb in the infant's airway, squeeze the bulb to expel all of the air. Release the bulb, once the tip is in the airway. Since infants are obligate nose breathers, suctioning the mouth first, then suctioning the nose is recommended. This will prevent aspiration, if the baby should gasp, while the nose is being suctioned. Apply the bulb syringe; to the baby's airway 2 or 3 times each, to the nose and mouth or until all secretions are removed. Due to the fragile nature of the neonates tissues, caution should be exercised, to not make contact with the back of the babies airway, as this could cause injury, and swelling to the airway.
4. Normal respiratory rates and heart rates in the neonate are:  

Respiratory rate – 40 – 60 bpm  
Heart rate – 100 – 160 bpm
5. During resuscitation:
  - A. If patient is cyanotic but heart rate is > 100 bpm use blow-by oxygen through oxygen tubing directed toward the babies mouth.
  - B. If the infants pulse is < 100 bpm, respirations are irregular, muscle tone or color is poor provide PPV with BVM and oxygen.
  - C. If the pulse is less than 60bpm or is between 60 – 80 bpm and not increasing after ventilatory assistance or oxygen, start CPR. The rate will be 120 bpm or a ratio of 3:1, depth  $\frac{3}{4}$ ".

6. What if the chemstrip had been 45?
- For a premature infant this is still normal but raises the concern that the infant could become hypoglycemic during transport. This increases the importance of a rapid transport.
  - Increased work of breathing quickly depletes glucose stores in the newborn. It is extremely important to evaluate the glucose levels in neonates who are in distress. This will help determine if they are hypoglycemic. This condition could be life threatening if not corrected.
7. The umbilical cord should be clamped 3 to 4 inches away from the infant. The cord should be clamped twice. The clamps should be placed 1 inch apart from each other, using a sharp instrument, cut the cord between the two clamps. Unless an urgent situation exists, wait for the umbilical cord to stop pulsating before cutting it.
8. One of the greatest dangers to the neonate is hypothermia. Hypothermia can significantly reduce the infant's chance for survival. Hypothermia is caused when the wet infant is exposed to the cool environmental conditions outside the womb. It is imperative to dry the newborn as quickly as possible after delivery. The blanket or towel used to dry the newborn should be discarded and the infant should be re-wrapped in a dry blanket. Placing a stockinette on the infant's head is also important in preventing body heat loss. The head is the major source of heat loss in the infant, due to its larger surface area in proportion to the body.
9. Vigorously stimulating the infant by rubbing while drying, rubbing its back and thumping the soles of the feet help to stimulate crying and circulation. A lusty cry will help expand the newborns collapsed lung and improve oxygenation.
10. The Apgar score is utilized to grade the newborn's need for additional help. By grading heart rate, respirations, muscle tone, color and reflex irritability the infant's need for support can be measured.

#### APGAR SCORE

SIGN	0	1	2
Heart Rate	Absent	<100	>100
Respirations	Absent	Slow (<40) irregular	>40
Muscle Tone	Limp	Slow Flexion	Vigorous
Reflex Irritability	None	Grimace	Cough/Sneeze
Color	Diffusely pale/ Cyanotic	Centrally Pink	Completely Pink

## **Newborn Scenario - 2**

(Full Term/Meconium Stained)

A twenty-two year old woman calls you to the scene of a delivery. She passed amniotic fluid just before you arrived. She does have IV track marks and you observe empty wine bottles on the floor. Her contractions are one minute apart and she feels like pushing. A neighbor is present.

Is there any other information that you would try to gather quickly that would be of immediate importance to the newborns resuscitation? (prenatal history)

### Expected Responses:

1. Have you been receiving prenatal care
2. Any complications with this pregnancy
3. How many other pregnancies
4. Color and odor of fluid?
5. Due date?
6. Single or multiple birth?

### Instructor's Reply:

1. No
2. No, "Just like my other pregnancies"
3. 4 other children
4. Fluid is green colored like pea soup
5. She thinks she is due now
6. Unknown, "I sure hope only one."

You decide that you have a maximum of five minutes. You are a two-person team and your partner goes to attend to the mother. The neighbor will coach the mother during the delivery and then stay with her after the delivery while you both attend the baby. (Pick one student to be the leader of the resuscitation.) How would you use the next five minutes?

### **Expected Responses:**

(Instructor: Since this part of the scenario is a repeat of Scenario I, it should be done quickly.)

1. Assign roles
  - a. Airway/ventilation (leader)
  - b. Dry/warm/stimulate/monitor and support circulation if necessary (Other Rescuer)
  - c. Neighbor to coach mother specifically with respect to panting and refraining from pushing after delivery of the head.
2. The Rescuer to handle delivery should instruct the mother of the need to suction her baby's nose and mouth after the head is delivered. She must stop pushing when told, and she should begin panting to prevent the baby from being delivered too rapidly. The neighbor should coach the mother in this regard.
3. The Rescuer delivering the baby should have a Yankauer suction catheter and portable suction ready for immediate use.
4. Prepare equipment
  - a. Airway
    1. Bulb syringe
    2. Yankauer suction catheter/portable suction
    3. Oral airways
  - b. Breathing
    1. O2 tank
    2. O2 Mask
    3. Neonatal sized BVM unit with reservoir and appropriate sized masks
    4. Oxygen tubing
  - c. Drying and warming equipment
    1. Warm towels or blankets
    2. Optional: silver swaddler
    3. Stockinette for the head
    4. Consider raising the temperature of the house
  - d. Other equipment
    1. OB kit with all appropriate items including cord clamp, sterile drapes, scalpel, 4x4's (sterile), sanitary pad
    2. Chemstrips

The infant's head is delivered. How would you proceed?

### **Expected Responses:**

The Rescuer should instruct the mother to stop pushing and to pant. He should then suction the mouth, pharynx, and nose vigorously until clear, and **only** then, instruct the mother to start pushing again. A small, blue infant is then delivered with irregular respirations. What steps should be taken next?

The two Rescuers should work simultaneously.

<u>Rescuer:</u>	<u>Instructor's Responses:</u>
1. Utilizes infection control measures, PPE/BSI	1. Apply gloves (sterile), water proof gown, face mask, eye protection, avoid touching the vaginal area or the baby with anything that isn't sterile
2. After the head is delivered instruct Mother to stop pushing and pant, aggressively suction nose and mouth until secretions are clear, wipe face with sterile 4x4's	2. Mother pants, babies face covered in light green substance green liquid suctioned from airway (nose & mouth), green substance removed from face & head
3. Continue delivery of the baby	3. Baby's body delivered
4. Aggressive suctioning	4. Secretions become clear
5. Air-sniffing, jaw thrust, check HR, dry/warm/stimulate	5. HR is >100
6. Blow-by oxygen 6L/min dry/warm/stimulate Check HR	6. Remains blue, HR remains >100 (If PPV mask is suggested by the EMT, discuss the desirability of deferring PPV in a meconium baby because of the increased risk of pneumothorax.)
7. Change to dry, warm blankets,	7. Infant begins to have regular

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| <p>continue to dry and stimulate</p> <p>8. Remove blow-by oxygen</p> | <p>rhythmic respirations and becomes pink with good tone.</p> <p>8. Infant remains pink with regular respirations and no respiratory distress.</p> |
|--|--|

**(Instructor)**

How would you proceed?

**Expected Responses:**

1. Keep infant warm
  - a. Wrap baby in warm blankets
  - b. May use a silver swaddler
  - c. Warm ambulance
  - d. Stockinette
2. Show baby to mother
3. Move quickly. Because the infant is small, hypoglycemia is a risk
4. Chemstrip prior to transport

A few questions that may be posed at the end of the scenario include:

1. What is the heart rate had fallen below 100?  
 ANSWER: PPV with a BVM would be indicated if there were no more meconium staining.
2. Why was the infant small?  
 ANSWER: The two possibilities are prematurity or an undernourished term baby. The latter is a definite possibility given that the mother's drug habit and the mother's estimation of her due date.
3. Should there be a concern for drug induced respiratory depression in this infant?  
 ANSWER: No. Infants born to drug addicted mothers do not usually experience respiratory depression at birth. The significant problem of drug withdrawal will be the main concern. It will not manifest itself until after infant is in the hospital. It is important to inform hospital personnel that this may be a problem.

**Knowledge Points:**

Meconium is the infant's first bowel movement. Passage of meconium, prior to delivery, can cause serious complications, in the newborn. If the neonate passes meconium before birth, it usually indicates that the baby has been stressed in some way prior to birth. It can indicate several serious conditions. Hypoxia, prolonged labor, blood loss, and compression of the umbilical cord may contribute to the passage of meconium. After it is passed, meconium mixes with the amniotic fluid, and turns it from a clear, clean fluid to a variation of colors, from pale green to blackish green, with a foul odor. If meconium gets into the infant's airway, and is not removed before the infant takes its first breath, it can be deadly. Meconium aspiration can cause respiratory distress, pneumothorax, pneumonia and death. The key to preventing the aspiration of meconium, is to remove it from the airway, before the infant takes its first breath. Vigorous suctioning of the meconium-stained infant's pharynx, should be performed immediately after the head is delivered, before the neonate has a chance to take its first breath. After the head is delivered, it is important to instruct the mother to pant and not to push until the airway has been completely suctioned. The nose, mouth and pharynx should be vigorously suctioned with a bulb syringe. Suctioning is limited to 30 seconds at a time to prevent hypoxia.

### **Newborn Scenario - 3**

(Asphyxiated Term Infant)

A 42-year-old woman has called you to the scene of an imminent delivery with eight older children. She appears to be in good health and brags that she has not “been to a doctor in years!” She began cramping a short time ago (approximately one hour) and she passed amniotic fluid a few minutes ago. Her pains are close together now and she feels like pushing.

A neighbor is present who has seen deliveries before and is willing to help.

Is there any other information you would try to gather quickly?

#### **Expected Responses:**

1. Have you been receiving prenatal care?
2. Any complications with pregnancy?
3. How many other previous pregnancies?
4. Color and odor of fluid?
5. Due date?
6. Single or multiple birth?

#### **Instructor's Reply:**

1. No, “haven’t seen a doctor in years”
2. No, not any different than other pregnancies
3. Has 8 children
4. Fluid was clear
5. Not certain, “soon I think”
6. Not known

#### **Instructor:**

You decide that you have approximately five minutes to spare. You are a two person team. Your partner goes to attend to the mother. The neighbor will coach the mother during the delivery and will stay with the mother after delivery so that you both may initially attend to the baby. (Pick one student to be the leader of the resuscitation.) How would you use the next 5-10 minutes?

#### **Expected Responses:**

1. Assign roles
  - a. Airway/Ventilation (leader)
  - b. Dry/warm/stimulate/monitor and support circulation if necessary (other EMT)
2. Prepare space - as in scenarios I and II
3. Prepare equipment - as in scenarios I and II

This delivery is difficult, taking much longer than anticipated (10 minutes). The apparently term baby is born with the cord around his neck. He is floppy, blue, and apneic. You deliver the baby and remove the cord from the neck. The cord is clamped at the level of the mother. How would you proceed?

### **Expected Responses:**

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Position – flat surface (sterile drape), open airway – air sniffing position, jaw thrust, look, listen & feel, assess breath sounds, skin color, muscle tone	1. Airway open & clear, RR=0 no spontaneous chest rise, respiratory effort, or breath sounds, cyanotic, floppy, no spontaneous movement
2. Very quick bulb suction of mouth and nose (be sure air is out of bulb prior to insertion)	2. All secretions removed
3. Begin PPV with BVM with 100% oxygen at 30-40/min. <b>(first two breaths should be delivered rapidly without O<sub>2</sub>)</b> , at 40 (just enough for adequate chest rise) assess breath sounds, skin color	3. Patient has no gag reflex, RR=0, breath sounds are equal & clear, good symmetrical chest rise
4. Assess circulation: brachial/umbilical pulse, skin color/temp, capillary refill	4. Umbilical pulse felt, HR=40 bpm, cyanotic, cool, CRT=5 seconds
5. Dry baby off with sterile towel or 4x4's, stimulate (rub vigorously, thump feet), warm baby (wrap in blanket/sliver swaddler and cover head with cap)	5. Baby apneic, RR=0, cyanotic, no spontaneous movement, floppy, no chest rise
6. Start CPR – circle chest and use thumbs to compress, rate 100, ratio (3:1), ½" – 1" depth	6. After 1 minute of CPR, no change, HR=40 bpm, RR=0, cyanotic, floppy

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| 7.  | Continue to ventilate with minimal pressure necessary to achieve chest rise, until baby is breathing on his own, dry/warm/stimulate | 7.  | No change  |
| 8.  | After 5 minutes of CPR – reassess ABC’s, muscle tone, skin color/temp   | 8.  | Brachial pulse felt, HR=80 bpm, RR=0, trunk pinkening up, warm dry, floppy   |
| 9.  | Continue to ventilate with minimal pressure necessary to achieve chest rise until baby is breathing on its own,                     | 9.  | Attempting occasional gasping, respirations, HR=140 bpm, trunk pink, extremities cyanotic                                |
| 10. | Replace wet blanket used to dry baby with a dry blanket   | 10. | Better respiratory effort observed, HR=158 bpm, extremities pinkening up, improved muscle tone, minor movements observed |
| 11. | Prepare to load and go  | 11. | <b>Asphyxia Due to Umbilical Cord Being Wrapped Around Neck – Full Term Infant</b>                                       |
| 12. | Check Chemstrip   | 12. | Chemstrip=60   |
| 13. | Reassess ABC’s, muscle tone, skin color/temp, (always reassess after moving patient)  | 13. | Airway open & clear, RR=20, breath sounds equal & clear, muscle tone continues to improve, trunk pink, extremities pale  |
| 14. | Continue PPV with BVM and 100% oxygen, until infant is spontaneously breathing on its own at a rate of 40 breaths per minute        | 14. | Airway open & clear, RR=24, HR=160 bpm, trunk pink, extremities pale, muscle tone continues to improve                   |

How would you prepare transport?

1. Warm
2. Ventilate until regular breathing is established then oxygen by mask to maintain color; resume PPV if color deteriorates; chemstrip prior to transport (the risk of hypoglycemia is great because asphyxia results in a rapid utilization of glucose.)

### **Knowledge Points:**

1. Obtaining a good prenatal history, can help determine if possible complications may arise for the baby, and the mother during childbirth.
2. Infection control is extremely important during childbirth. Foremost, it is paramount to protect the rescuer from contamination. There are copious amounts of blood and other body fluids present during childbirth. Rescuers must wear gloves, water proof gown (to protect their clothing), a face mask (to prevent secretions from splashing into the nose and mouth) and goggles (to prevent splashing into the eyes). It is also important to protect the neonate from contamination, by infectious substances from the mother, and the rescuers. When preparing the mother for delivery, drape her with sterile material (in the OB kit), and prepare a sterile birthing area. If possible, when drying the infant off, utilize sterile towels and 4x4's. Utilize sterile gloves whenever handling the neonate.
3. Neonates usually have secretions in their mouth and nose at birth these must be removed. The simplest way to remove secretions from an infant's airway is with the bulb syringe, included in the OB kit. Utilizing it properly, is the key to good airway management. Before placing the tip of the bulb in the infants airway, squeeze the bulb to expel all of the air. Release the bulb once the tip is in the airway. Since infants are obligate nose breathers, suctioning the mouth first and then the nose is recommended. This will prevent aspiration, if the baby should gasp, when the nose is being suctioned. Apply the bulb syringe to the babies airway 2 or 3 times each, to the nose and mouth, or until all secretions are removed. Due to the fragile nature of the neonates tissues, caution should be exercised to not make contact with the back of the babies airway, as this could cause injury and swelling to the airway.
4. Normal respiratory rates and heart rates in the neonate are:  

Respiratory rate – 40 – 60 bpm  
Heart rate – 100 – 160 bpm
5. During resuscitation:
  - A. If patient is cyanotic but heart rate is > 100 bpm use blow-by oxygen through oxygen tubing directed toward the babies mouth.
  - B. If the infants pulse is < 100 bpm, respirations are irregular, muscle tone or color is poor provide PPV with BVM and oxygen.
  - C. If the pulse is less than 60 bpm or is between 60 – 80 bpm and not increasing after ventilatory assistance or oxygen, start CPR. The rate will be 120 bpm or a ratio of 3:1,

depth  $\frac{3}{4}$ ".

6. What if the chemstrip had been 45?

- A. For a premature infant this is still normal but raises the concern that the infant could become hypoglycemic during transport. This increases the importance of a rapid transport.
- B. Increased work of breathing quickly depletes glucose stores in the newborn. It is extremely important to evaluate the glucose levels in neonates who are in distress. This will help determine if they are hypoglycemic. This condition could be life threatening if not corrected.

7. The umbilical cord should be clamped 3 to 4 inches away from the infant. The cord should be clamped twice. The clamps should be placed 1 inch apart from each other. Using a sharp instrument cut the cord between the two clamps. Unless an urgent situation exists, wait for the umbilical cord to stop pulsating before cutting it.

8. One of the greatest dangers to the neonate is hypothermia. Hypothermia can significantly reduce the infant's chance for survival. Hypothermia is caused when the wet infant is exposed to the cool environmental conditions outside the womb. It is imperative to dry the newborn as quickly as possible after delivery. The blanket or towel used to dry the newborn should be discarded and the newborn re-wrapped in a dry blanket. Placing a stockinette on the infant's head is also important in preventing body heat loss. The head is the major source of heat loss in the infant due to its larger surface area in proportion to the body.

9. Vigorously stimulating the infant by rubbing while drying, rubbing its back and thumping the soles of the feet help to stimulate crying and circulation. A lusty cry will help expand the newborns collapsed lung and improve oxygenation.

10. The Apgar score is utilized to grade the newborn's need for additional help. By grading heart rate, respirations, muscle tone, color and reflex irritability the infant's need for support can be measured.

#### **APGAR SCORE**

<b><u>SIGN</u></b>	<b>0</b>	<b>1</b>	<b>2</b>
Heart Rate	Absent	<100	>100
Respirations	Absent	Slow (<40) irregular	>40
Muscle Tone	Limp	Slow Flexion	Vigorous
Reflex Irritability	None	Grimace	Cough/Sneeze
Color	Diffusely pale/ Cyanotic	Centrally Pink	Completely Pink

## **Newborn Scenario - 4**

(Term Delivery)

You are called to the scene where a 15-year-old girl is lying on the living room couch screaming. A quick examination reveals crowning and impending delivery. It will be 20 minutes before a transport unit arrives.

<u>Rescuer</u>	<u>Instructor's Response</u>
1. Utilizes infection control measures PPE/BSI	1. Apply sterile gloves, water proof gown, facemask, eye protection, avoid touching vaginal area or baby with anything that isn't sterile
2. With baby level with mother, quickly clamp and cut the cord and place in prepared place (sterile)	2. Feel for pulse in umbilical cord, wait for the cord to stop pulsating before cutting the cord
3. Position – flat surface, (sterile drape), open airway – air sniffing position, jaw thrust, look, listen & feel, assess chest rise, respiratory efforts, assess breath sounds, skin color, muscle tone	3. Airway obstructed with secretions, RR=0, no spontaneous chest rise, respiratory efforts, or breath sounds, cyanotic, floppy
4. Very quickly suction (bulb syringe) nose and mouth ( <b>be sure air is out of bulb prior to insertion</b> )	4. Patient has no gag reflex, clear secretions
5. Begin PPV with BVN with 100% oxygen and oral airway, ( <b>First two breaths should be delivered rapidly without O<sub>2</sub></b> ) at 40, (just enough for chest rise), assess breath sounds, assess skin color	5. Good chest rise, breath sounds equal and clear, skin cyanotic
6. Assess circulation: brachial/umbilical	6. Umbilical pulse felt, HR=100 bpm,

	pulse, skin color/temp, capillary refill		skin cyanotic, cool, CRT=5 seconds
7.	Dry baby off with sterile towels or 4x4's (rug vigorously, thump feet), warm baby (wrap in blanket/silver swaddler and cover head with cap)	7.	Apneic, RR=0, extremities cyanotic, trunk pink, cool
8.	Reassess airway, respiratory effort, chest rise, skin color/temp, pulse	8.	Airway open, RR=20, poor chest rise, torso pink, extremities cyanotic, cool, HR=110 bpm
9.	Reassess jaw thrust (if oral airway not used), reassess ventilation breath sounds equal & clear, continue efforts, slightly increase ventilation pressures for 1 or 2 breaths if baby not improving with present efforts	9.	Chest rise improving, RR=20, breath sounds equal & clear, continue PPV
10.	Continue drying, warming, stimulating infant, remove blanket/towel initially used to dry baby (wet) and replace with another blanket (dry)	10.	Baby continues to improve
11.	Continue PPV with BVM and 100% oxygen until infants develops regular respirations	11.	After 5 minutes of bagging infant has regular rhythmic breathing with good chest rise, breath sounds equal and clear, RR=56, extremities pinking up
12.	Stop bagging and switch to mask after respiratory efforts improve	12.	If O2 not used, infant becomes cyanotic, otherwise infants trunk and extremities pink up
13.	Check chemstrip prior to transport	13.	Chemstrip=80

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| 14. | Load and go  | 14. | <b>Respiratory Arrest/Term Delivery</b>   |
| 15. | Reassess ABC's status ( <b>always reassess after moving patient</b> )        | 15. | RR=56, good chest rise, without retractions or nasal flaring, HR=152 bpm, brachial pulse strong, skin pink, warm, dry |
| 16. | Reassess PRN   | 16. | Baby continues to improve   |
| 17. | Continue to support infant respiratory efforts & continue re-warming efforts | 17. | 6 liters O2 by mask , place baby in recovery position, head lower than body   |

### **Knowledge Points:**

1. Obtaining a good prenatal history can help determine if possible complications may arise for the baby and the mother during childbirth.
2. Infection control is extremely important during childbirth. Foremost, it is paramount to protect the rescuer from contamination. There are copious amounts of blood and other body fluids present during childbirth. Rescuers must wear gloves, waterproof gown (to protect their clothing), a facemask (to prevent secretions from splashing into the nose and mouth) and goggles (to prevent splashing into the eyes). It is also important to protect the neonate from contamination by infectious substances from the mother and the rescuers. When preparing the mother for delivery, drape her with sterile material (in the OB kit) and prepare a sterile birthing area. If possible, when drying the infant off, utilize sterile towels and 4x4's. Utilize sterile gloves whenever handling the neonate.
3. Neonates usually have secretions in their mouth and nose at birth and must be removed. The simplest way to remove secretions from an infant's airway is with the bulb syringe included in the OB kit. Utilizing it properly is the key to good airway management. Before placing the tip of the bulb in the infant's airway, squeeze the bulb to expel all of the air. Release the bulb once the tip is in the airway. Since infants are obligate nose breathers, suctioning the mouth, and then the nose, is recommended. This will prevent aspiration, if the baby should, gasp, when the nose is suctioned. Apply the bulb syringe to the babies airway 2 or 3 times each, to the nose and mouth, or until all secretions are removed. Due to the fragile nature of the neonates tissues, caution should be exercised, to not make contact with the back of the babies airway, as this could cause injury and swelling to the airway.
4. Normal respiratory rates and heart rates in the neonate are:  

Respiratory rate – 40 – 60 bpm  
Heart rate – 100 – 160 bpm
5. During resuscitation:
  - A. If patient is cyanotic but heart rate is > 100 bpm use blow-by oxygen through oxygen tubing directed toward the babies mouth.
  - B. If the infants pulse is < 100 bpm, respirations are irregular, muscle tone or color is poor provide PPV with BVM and oxygen.
  - C. If the pulse is less than 60 bpm or is between 60 – 80 bpm and not increasing after ventilatory assistance or oxygen, start CPR. The rate will be 120 bpm or a ratio of 3:1, depth  $\frac{3}{4}$ ".

6. What if the chemstrip had been 45?
- For a premature infant this is still normal but raises the concern that the infant could become hypoglycemic during transport. This increases the importance of a rapid transport.
  - Increased work of breathing quickly depletes glucose stores in the newborn. It is extremely important to evaluate the glucose levels in neonates who are in distress. This will help determine if they are hypoglycemic. This condition could be life threatening if not corrected.
7. The umbilical cord should be clamped 3 to 4 inches away from the infant. The cord should be clamped twice. The clamps should be placed 1 inch apart from each other. Using a sharp instrument, cut the cord between the two clamps. Unless an urgent situation exists, wait for the umbilical cord to stop pulsating before cutting it.
8. One of the greatest dangers to the neonate is hypothermia. Hypothermia can significantly reduce the infant's chance for survival. Hypothermia is caused when the wet infant is exposed to the cool environmental conditions outside the womb. It is imperative to dry the newborn as quickly as possible after delivery. The blanket or towel used to dry the newborn should be discarded, and re-wrap the newborn in a dry blanket. Placing a stockinette on the infant's head is also important in preventing body heat loss. The head is the major source of heat loss in the infant due to it's larger surface area in proportion to the body.
9. Vigorously stimulating the infant by rubbing while drying, rubbing its back and thumping the soles of the feet help to stimulate crying and circulation. A lusty cry will help expand the newborns collapsed lung and improve oxygenation.
10. The Apgar score is utilized to grade the newborn's need for additional help. By grading heart rate, respirations, muscle tone, color and reflex irritability the infant's need for support can be measured.

<u>APGAR SCORE</u>			
SIGN	0	1	2
Heart Rate	Absent	<100	>100
Respirations	Absent	Slow (<40) irregular	>40
Muscle Tone	Limp	Slow Flexion	Vigorous
Reflex Irritability	None	Grimace	Cough/Sneeze
Color	Diffusely pale/ Cyanotic	Centrally Pink	Completely Pink

### **Newborn Scenario - 5**

(Meconium Stained Newborn)

You arrive on the scene of an infant who is crowning and notice the amniotic fluid is stained with meconium.

The two Rescuers should work simultaneously.

<u>Rescuer:</u>	<u>Instructor's Responses:</u>
1. Utilizes infection control measures, PPE/BSI, ask quick history	1. Apply gloves (sterile), water proof gown, facemask, eye protection, avoid touching the vaginal area or the baby with anything that isn't sterile, ETA of ALS unit is 10 minutes, no prenatal care, due date "any time now", 2 other children
2. After the head is delivered instruct mother to stop pushing and pant, suction nose and mouth, wipe face with sterile 4x4's	2. Mother pants, babies face covered in light green substance, green liquid suctioned from airway until secretions are clear, green substance removed from face & head
3. Aggressively suction infant	3. Secretions become clear
4. Complete delivery of neonate, clamp and cut cord	4. Infant's body delivers without complication, cord is clamped and cut quickly
5. Position - flat surface (sterile drape), open airway - air sniffing position, jaw thrust, look, listen and feel, assess respiratory effort, assess skin color, assess muscle tone,	5. Airway clear, opened by jaw thrust gasping respirations, RR=20 moderate chest rise, breath sounds equal and clear, decreased, cyanotic no spontaneous movement, flaccid

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| 6.  | Blow by oxygen 6 liters by oxygen, continue to dry/warm/stimulate                | 6.  | Remains cyanotic, RR=24, mask, HR=>100 bpm, skin feels cool <b>(if rescuer suggests PPV, discuss the need to assure that airway has been thoroughly suctioned to avoid forcing meconium into the lungs, also discuss the risk of pneumothorax in the meconium baby)</b> |
| 7.  | Assess circulation: brachial/umbilical pulse, skin color/temp, capillary refill, | 7.  | Umbilical pulse felt, weak brachial, HR=>100 bpm, cyanotic, CRT=4 seconds   |
| 8.  | Change to dry, warm blankets, continue to dry and stimulate                      | 8.  | Infant begins to have regular rhythmic respirations RR=46, breath sounds equal & clear, good chest rise, skin completely pink, strong spontaneous movements, good muscle tone   |
| 9.  | Remove blow-by oxygen  | 9.  | Infant remains pink with regular respirations and no respiratory distress   |
| 10. | Reassess ABC's, muscle tone, skin color for changes                              | 10. | HR=140 bpm, brachial, RR=56, good chest rise, skin pink, warm, dry  |
| 11. | Place infant in recovery position on the left side, head lower than body         | 11. | Infant remains pink with regular respirations and no respiratory distress   |
| 12. | Check chemstrip prior to transport   | 12. | Chemstrip=100   |
| 13. | Load and go  | 13. | <b>Respiratory Distress with Meconium Staining - Full Term</b>  |
| 14. | Reassess ABC's, muscle tone, assess skin color/temp                              | 14. | Infant remains pink, RR=40, good chest rise, HR=150 bpm, warm, dry  |

### **Knowledge Points**

Meconium is the infant's first bowel movement. Passage of meconium, prior to delivery can cause serious complications in the newborn. If the neonate passes meconium before birth, it usually indicates that the baby has been stressed, in some way prior to birth. It can indicate several serious conditions. Hypoxia, prolonged labor, blood loss, and compression of the umbilical cord may contribute to the passage of meconium. After it is passed, meconium mixes with the amniotic fluid, and turns it from a clear, clean fluid to a variation of colors, from pale green to blackish green, with a foul odor. If meconium gets into the infant's airway and is not removed before the infant takes its first breath, it can be deadly. Meconium aspiration can cause respiratory distress, pneumothorax, pneumonia and death. The key to preventing the aspiration of meconium is to remove it from the airway, before the infant takes its first breath. Vigorous suctioning of the meconium-stained infant's pharynx, should be performed immediately after the head is delivered, before the neonate has a chance to take its first breath. After the head is delivered, it is important to instruct the mother to pant and not to push, until the airway has been completely suctioned. The nose, mouth and pharynx should be vigorously suctioned with a bulb syringe. Suctioning is limited to 30 seconds at a time to prevent hypoxia.

### **Newborn Scenario - 6**

(Premature Delivery - Very Small infant)

You arrive on the scene of a mother who has delivered a very small newborn (approximately 1 and 1-1/2 pounds)

(The two Rescuers should work simultaneously)

<u>Rescuer</u>	<u>Instructor's Responses</u>
1. Utilize infection control measures, 1. PPE/BSI, get a quick history	Apply gloves (sterile), water proof gown, face mask, eye protection, avoid touching vaginal area or baby with anything that isn't sterile, ETA of ALS unit is 15 minutes, prenatal care, due in 3 months, fluid clear, no other children, no problems with pregnancy
2. Hold baby level with mother, quickly clamp and cut cord, place baby on the prepared space	2. Feel for a pulse in umbilical cord first, should wait for cord to stop pulsating before cutting
3. Position flat surface (sterile drape), open airway – air sniffing position, jaw thrust/chin lift, look, listen and feel, assess respiratory effort, assess breath sounds, assess skin color, assess muscle tone	3. Airway obstructed with secretions, RR=0, cyanotic, no spontaneous movement, floppy
4. Begin PPV with BVM with 100% O <sub>2</sub> and oral airway ( <b>first two breaths should be delivered rapidly with out O<sub>2</sub></b> ) at 40 bpm (just enough for adequate chest rise), assess breath sounds, assess skin color	4. Patient has no gag reflex, breath sounds are equal & clear, good symmetrical chest rise, cyanotic
5. Assess circulation: brachial/umbilical	5. Umbilical pulse felt, HR=80 bpm,

	pulse, skin color/temp, capillary refill		cyanotic, cool, CRT=5 seconds
6.	Dry baby off with sterile towels or 4x4's, 6. stimulate (rub vigorously, thump feet), warm baby (wrap in blanket/sliver swaddler and cover head with cap)	6.	Baby apneic, RR=0, cyanotic, no spontaneous movement, no chest rise
7.	Reassess airway, respiratory effort chest rise, skin color, pulse, muscle tone	7.	Poor chest rise, secretions still in airway, apneic, HR between 80–100 bpm, umbilical, cyanotic, flaccid
8.	Reassess jaw thrust, if oral airway not inserted, insert, slightly increase begin ventilation pressure for 1 or 2 breaths, then return to previous pressures, watch chest rise	8.	Good chest rise, trunk pinking up, HR=100 bpm, infant begins gasping
9.	Continue drying, warming and stimulating	9.	Baby continues to improve
10.	Continue BVM until infant develops regular respirations	10.	After 5 minutes of bagging infant has regular rhythmic breathing with grunting, nasal flaring and retractions, RR=48
11.	Stop bagging and switch to blow-by O2 because of respiratory distress Keep warm.	11.	If O2 is not used - infant becomes dusky, otherwise infant trunk remains pink but in respiratory distress
12.	Check chemstrip prior to transport.	12.	Chemstrip = 80
13.	Load and go	13.	<b>Premature Infant with Respiratory Compromise/ Distress</b>
14.	Reassess ABC's status (always reassess after moving patient), assess muscle tone	14.	Airway open, RR=54, HR=140 bpm, trunk pink, extremities cyanotic, warm, dry, spontaneous movement

observed

**Knowledge Points:**

1. Obtaining a good prenatal history, can help determine, if possible complications may arise for the baby, and the mother during childbirth.
2. Infection control is extremely important during childbirth. Foremost, it is paramount to protect the rescuer from contamination. There are copious amounts of blood and other body fluids present during childbirth. Rescuers must wear gloves, water proof gown (to protect their clothing), a facemask (to prevent secretions from splashing into the nose and mouth) and goggles (to prevent splashing into the eyes). It is also important to protect the neonate from contamination by infectious substances from the mother and the rescuers. When preparing the mother for delivery, drape her with sterile material (in the OB kit) and prepare a sterile birthing area. If possible, when drying the infant off, utilize sterile towels and 4x4's. Utilize sterile gloves whenever handling the neonate.
3. Neonates usually have secretions in their mouth and nose at birth, and these must be removed. The simplest way to remove secretions from a infants airway, is with the bulb syringe included in the OB kit. Utilizing it properly, is the key to good airway management. Before placing the tip of the bulb in the infant's airway, squeeze the bulb to expel all of the air. Release the bulb, once the tip is in the airway. Since infants are obligate nose breathers, suctioning the mouth and then the nose is recommended. This will prevent aspiration, if the infant should gasp, while the nose is being suctioned. Apply the bulb syringe to the babies airway 2 or 3 times, each to the nose and mouth, or until all secretions are removed. Due to the fragile nature of the neonates tissues, caution should be exercised to not make contact with the back of the babies airway, as this could cause injury, and swelling to the airway.
4. Normal respiratory rates and heart rates in the neonate are:  
  
Respiratory rate – 40 – 60 bpm  
Heart rate – 100 – 160 bpm
5. During resuscitation:
  - A. If patient is cyanotic but heart rate is > 100 bpm use blow-by oxygen through oxygen tubing directed toward the babies mouth.
  - B. If the infants pulse is < 100 bpm, respirations are irregular, muscle tone or color is poor provide PPV with BVM and oxygen.
  - C. If the pulse is less than 60 bpm or is between 60 – 80 bpm and not increasing after ventilatory assistance or oxygen, start CPR. The rate will be 120 bpm or a ratio of 3:1, depth  $\frac{3}{4}$ ".

6. What if the chemstrip had been 45?
- A. For a premature infant this is still normal but raises the concern that the infant could become hypoglycemic during transport. This increases the importance of a rapid transport.
  - B. Increased work of breathing quickly depletes glucose stores in the newborn. It is extremely important to evaluate the glucose levels in neonates who are in distress. This will help determine if they are hypoglycemic. This condition could be life threatening if not corrected.
7. The umbilical cord should be clamped 3 to 4 inches away from the infant. The cord should be clamped twice. The clamps should be placed 1 inch apart from each other, using a sharp instrument, cut the cord between the two clamps. Unless an urgent situation exists, wait for the umbilical cord to stop pulsating before cutting it.
8. One of the greatest dangers to the neonate is hypothermia. Hypothermia can significantly reduce the infant's chance for survival. Hypothermia is caused, when the wet infant is exposed to the cool environmental conditions outside the womb. It is imperative to dry the newborn as quickly as possible after delivery. The blanket or towel used to dry the newborn should be discarded and the newborn re-wrapped in a dry blanket. Placing a stockinette on the infant's head is also important, in preventing body heat loss. The head is the major source of heat loss in the infant due to its larger surface area, in proportion to the body.
9. Vigorously stimulating the infant by rubbing while drying, rubbing its back and thumping the soles of the feet help to stimulate crying and circulation. A lusty cry will help expand the newborns collapsed lung and improve oxygenation.
10. The Apgar score is utilized to grade the newborn's need for additional help. By grading heart rate, respirations, muscle tone, color and reflex irritability the infant's need for support can be measured.

#### APGAR SCORE

SIGN	0	1	2
Heart Rate	Absent	<100	>100
Respirations	Absent	Slow (<40) irregular	>40
Muscle Tone	Limp	Slow Flexion	Vigorous
Reflex Irritability	None	Grimace	Cough/Sneeze
Color	Diffusely pale/ Cyanotic	Centrally Pink	Completely Pink